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EXPLORATION IN WESTERN CHINA.*

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In November, 1898, I was fortunate enough to be attached by the Government of India to an expedition under Major Davies, of the Oxfordshire Light Infantry, to explore, carefully map, and report on the province of Yunnan, in South-Western China. After seven months' wanderings we returned to England, and again entered the province in November, 1899. This second year, having completely surveyed the more important portions of Yunnan, we extended our journey into the province to the north, Sechuan and Chinese Tibet, finally reaching Shanghai, down the Yangtse, in July, 1900, just at the time of the troubles in Northern China.

From a geographical point of view, the most interesting feature in Yunnan (*vide* map) is the extraordinary number of large rivers which flow through or take their rise within the province. Commencing on the west, we find many affluents of the Irrawadi, though the main river is situated in Burma; next comes the Salwen, entering from the unknown in Tibet, flowing nearly due south, until it enters Burma, and forming in places the boundary between Burma and Siam, finally reaches the sea at Moulmein. Then we have the Mekong, entering the province in a similar manner to the Salwen, also of great use as a frontier line first between Burma and China, then between Burma and French territory, and finally between the latter and Siam; it is a river

* Read at the Royal Geographical Society, November 24, 1902. There is so much new work to be incorporated in Captain Ryder's map that it will not be ready for some time. In binding it should be inserted at the end of this number.

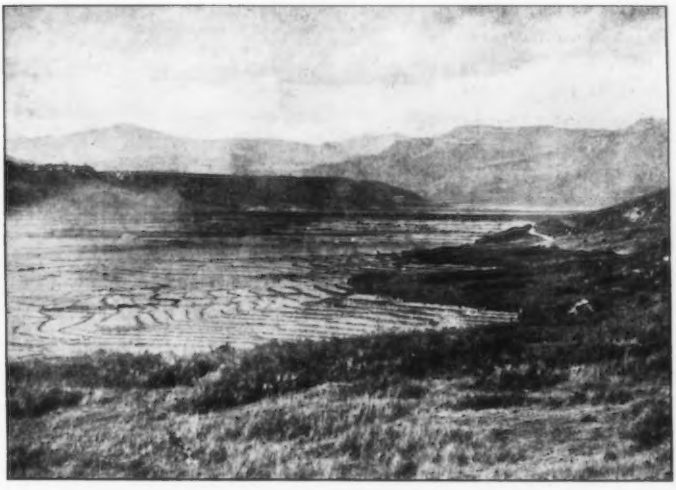
which has a great fascination for French explorers, who have done much towards mapping its course. Thirdly, and most famous, flows the Yangtse, at first parallel to the other two, but near Tali-fu it takes a great bend due east, then another due north, leaving room for the plateau from which the Red river of Tongking and the West or Canton river take their sources.

On this plateau lie the majority of the seventy-odd cities of the province, some in reality mere villages, others large towns, but all have the official rank of city, and all, with one exception, are walled. The exception is Li-chiang-fu; on my inquiry as to the reason it was not walled, I was told that it was because there was no high military official there. Now, each of these cities lies in a plain; in the east, where the plains are larger, two or more cities are found in one plain, but no city exists where there is no plain; the consequence is that these plains, although they do not bulk large on a map, are far and away the most important portions of Yunnan, both politically and commercially. They vary in size, a very common one being 8 miles by 2 or 3; and are entirely populated by Chinese, who have the faculty of keeping the best of everything for themselves, pushing the earlier inhabitants, such as Lolos and Shans, into the hills and into the deep and feverish valleys.

We made our start from Bhamo, and, marching up the valley of the Taeping river, crossed the frontier after two marches, and commenced surveying. On our first march in Chinese territory we had to pass several small stockades, and I was rather doubtful whether the Chinese soldiers might object to our surveying. However, I was soon relieved, as I found my Indian surveyor had put up his plane-table close to one of the stockades, and was calmly surveying, while the garrison of one man, armed with a pipe and a long spear, was gazing at him with awe and surprise.

Of the country before we went into it very little was really known; travellers there had been in plenty, but only a few of them, notably Captain Gill and Mr. Baber amongst English, and M. Garnier and Prince Henry of Orleans amongst French, had made any attempt at real surveying. Major Davies had, however, in 1895, done a lot of work in the western portion of the province. We also had a Chinese map, which must originally, as constructed by the Jesuits, have been a very good one, but many editions in the hands of the Chinese printers had gradually spoilt it, and, except in the matter of giving us the correct names of the towns, it proved worse than useless. The trouble we took over our surveying was always a source of wonder to the Chinese. The country had gone on very well for hundreds of years without maps, what was the good of them now? They thought us idiots, but let us survey without let or hindrance, so we did not trouble ourselves much about their opinion.

FIRST STAGE ON BHAMO-TALIFU ROAD.
(*From a photograph by Capt. Ryder.*)



REMAINS OF ANCIENT LAKE BED PLAIN, NAN-TIEN VALLEY.
(*From a photograph by the late Capt. Watts-Jones.*)

The villages in the Taeping valley are inhabited by Shans, and are so surrounded by bamboos that the houses are scarcely visible from outside. This valley is thickly populated, and is a promising line for a railway as far as Momien, though it could never be extended beyond that town. We also met with our first chain suspension bridge, a kind of bridge of which the Chinese are very fond; they make them well, but do not keep them in repair.

In Momien we had our first reception from a hostile crowd. As soon as we entered the town late one evening, a mob collected; only insulting at first, they presently began stone-throwing, and we all got hit several times. Our baggage had arrived ahead of us, and we did not know where it had gone to. As the crowd got larger, the stones got larger too, and the matter looked decidedly serious, when, fortunately, an extra large stone hit Major Davies on the funny bone. This gave the necessary fillip, and away he went straight into the crowd, followed by Captain Watts Jones and myself. The crowd fled so fast we only could each get home with our sticks on one head; unfortunately for the owner, it was the same head in each case. As soon as we turned again the crowd reassembled; we accordingly had to execute two charges more before we finally got into a temple in the official's quarters. Two ragged soldiers then appeared. They did not look up to much; however, they represented authority, and the crowd dispersed.

Next day the town was quiet, and the official, in a fright lest we should report him, was very polite. We accordingly went out to see a very fine waterfall, over which the Chinese threw five hundred Mahommedan prisoners at the close of the Mohammedan rebellion. In considering the history of Yunnan, it really is unnecessary to go further back than this rebellion. For many years, while the Chinese Imperial Government were fully occupied by the Taeping rebellion, the Mohammedans made great headway, most of the province falling into their hands. When the Chinese got to work, they swept the Mohammedans out of the country, only a few escaping to Burma, where, under the name of Panthays and under our protection, they have thrived wonderfully; but to this day half-deserted towns and ruined villages bear silent witness to the devastation created by this rebellion. Yunnan has not yet recovered from its effects, though thirty years have passed since its close.

At Momien and four other towns where there were telegraph stations I was able to obtain accurate longitudes by time comparisons over the telegraph wire with another officer at Bhamo. This is work that requires great accuracy, any error in seconds of time being multiplied fifteen times in seconds of distance. The observations at my end were carried out under difficulties. I used to slink down at dusk to the telegraph office, in order to avoid attracting a crowd, only

to find that the telegraph clerk had invited a select party of friends to watch the performance; they generally meant well, but it is somewhat trying, while engaged on delicate astronomical observations, to overhear remarks on one's personal appearance which were never flattering.

This telegraph line was, however, a great friend of ours, as it was for months our only means of receiving news of the outer world. The clerks only knew a few words of English, but they knew the English letters. The line is never used for through traffic; the probable time it takes for a message from Rangoon to reach Shanghai is about ten days, as the line is continually interrupted.

While Major Davies now kept up to the north of Momien, Captain Watts Jones and I went south to the Nam Ting valley to examine into the possibilities of a railway line. By surveying the main and side valleys it was soon obvious there was only one possible line; and this line, which Captain Watts Jones followed through up to Tali-fu and so on to Yunnan-fu, is the only through line into China from Burma that can ever be constructed.

In this matter of railway communication a great deal of hopeless ignorance of the country has been displayed, when we come to look at the various proposals that have been seriously put forward, and because our Government did not at once support these proposals, they (the Government) have been unwisely criticized. The first suggestion made was for a railway up through Siam and up the Mekong valley. This may at once be dismissed as impossible; the Mekong is a river which runs in deep gorges, with no inhabitants but those in a few miserable hamlets. When we come, however, to consider the question of a line from the Kunlong ferry up the Nam Ting valley, we once more enter the regions of possibility; and the Yunnan Company did a very public-spirited action in originating our expedition, while the Government of India showed their anxiety to obtain more reliable information, and getting the country well surveyed by attaching to the expedition several good native surveyors as well as myself. Any railway experts who discuss this question with our maps and reports before them are, at any rate, basing their opinions on reliable data. In a paper before a Geographical Society, it is, I consider, out of place to discuss the advantages and disadvantages of building this line. As the French are at present constructing their line from Tongin to Yunnan-fu, this question of railways in Yunnan becomes a political one.

There is no doubt a great future lies before the whole of China, in which Yunnan will not be behindhand, owing to its proximity to English and French possessions, to its richness in minerals, and to the fact that, while Burma and Tonkin are low and feverish, Yunnan rejoices in a splendid climate, due to the high elevation at which most of the towns lie. There is, however, every variety of elevation. In the north-west corner the three large rivers flow at a height of 7000 feet

CANAL NORTH OF TALIFU, CONSTRUCTED DURING THE MING DYNASTY.

(*From a photograph by the late Capt. Watts-Jones.*)

A SIDE LAGOON, TALIFU LAKE.

(*From a photograph by the late Capt. Watts-Jones.*)

above sea-level, with ranges of 20,000 feet and upwards intervening; they leave the province at elevations nearer 1000 feet. The cultivated plains all lie between 5000 and 8000 feet above sea-level.

Every one who has travelled in China finds the curiosity of the Chinese inexhaustible. It forms, perhaps, the most unpleasant part of a traveller's experience. In any of the town inns it is almost impossible to secure privacy, even in one's own room; sometimes a crowd would be insulting, but more often simply curious.

Until reaching the neighbourhood of Tali-fu, the only Chinese town of any importance is Yunchau, still mostly inhabited by Mohammedans; we therefore had quite a cordial welcome. It was one of the last towns to hold out in the rebellion; and my interpreter, whose old home it was, when twelve years of age, had escaped to Burma with his father when the town fell into the Chinese hands. He had only one failing, and that was drunkenness. He had three different stories of how he escaped, no one bearing the slightest resemblance to the others, and I could always accurately gauge his degree of drunkenness by asking him how he escaped from Yunchau, and waiting to see which story he would tell me. In other respects he was a splendid fellow.

In the matter of cultivation the Chinese generally are past masters. They display a wonderful amount of ingenuity in terracing their fields, and in their aqueducts and irrigation channels. Two crops are grown annually in Yunnan on most lands: the first, taking advantage of the rainy season, is usually rice; the second, wheat, opium, and peas or beans in about equal proportions. There are, of course, other crops, but these are the most important. In the neighbourhood of every village are numerous vegetable gardens, even the poorest mule-driver or labourer insisting on some vegetable with his rice, if he cannot afford pork. Should a railway be constructed connecting Burma with Yunnan, a large trade would arise in food-stuffs, crops preferring a cold climate such as exists on the uplands of Yunnan being exported to Burma, while rice would be sent up from the low-lying lands of Burma into Yunnan. At present no such trade exists, owing to the very expensive means of transport. A few rough carts exist in the eastern portion of the provinces, but the roads are bad and only exist for short distances; the bulk of the carrying-trade travels on the backs of mules, which is, of course, a method not suitable for the transporting of bulky food-stuffs over any but very short distances. Should there be, therefore, a failure of crops, a famine arises, and the inhabitants of that particular district have to shift for themselves.

Salt is the one article of food which is carried long distances. It is supplied from several salt-mines in different parts of the province; each mine is told off to supply certain districts, and very heavy are the punishments dealt out should the inhabitants of any district be found dealing in salt other than that from the district mine. Salt

forms one of the largest sources of revenue to the provincial government, and hence also to the officials. Any appointment connected with salt is therefore eagerly sought after, and the pockets of the officials connected with the mines must be protected even if it entails on the wretched villager the necessity of importing his salt from a distant mine instead of a near one, thus paying double or treble what he would otherwise have to do.

To follow my journey once more. I had to cross the Mekong by a ferry, and, crossing a wild mountainous tract of country, reached the town of Ching-tong-ting. Here I first met English missionaries, and it is not out of place to record here my warmest thanks for many a kindness and help I received from them throughout my journeys. People may differ in opinion as to the value of their work, but I maintain that they are doing a very great and noble work, and are of the utmost use in the matter of accustoming the Chinese to European customs and ideas.

Proceeding northwards towards Tali-fu, we passed amongst Lolos. It is difficult in any country to decide who are the real aboriginal inhabitants; it is more than likely that the Lolos may claim to be so for South-Western China. They have now been driven by the Chinese into the hills; but in parts of Sechuan they are still quite independent, and no Chinese dare enter their villages. They are much handsomer to our eyes than are the Chinese. On my arrival at Tali-fu I met Captain Watts Jones, and together we travelled north to the Yangtse. Many travellers have described Tali-fu. The lake is some 30 miles long, and 5 to 7 miles wide. On the eastern shore low reddish hills rise straight from the waters, but on the western side a slightly sloping and well-cultivated plain runs back a couple of miles to a very fine range, which reaches a height of 14,000 feet, the lake itself lying at an elevation of just under 7000 feet. Snow is found all the year round in sheltered spots on this range, while in winter it falls and lies down to the level of the lake. There is very good duck-shooting, particularly at the northern end, which is somewhat marshy. I cannot conceive a more ideal hill-station or sanatorium for fever-stricken Europeans from Burma or Tonking; but Yunnan abounds in such spots. The plain at each end of the western side of the lake is closed by an old line of fortifications, which are now, of course, useless. The lake drains into the Mekong by a rapid-running river, which in one fine gorge is jammed into a width of 3 yards; what the depth is no one knows.

As we went northwards the general elevation of the country increased, and the country became more Tibetan in character. We were on the main road to Batang and Tibet, the road that Captain Gill had travelled over. It was here we passed by a very fine canal constructed during the Ming dynasty, and also several very fine stone

CHINESE SHAN VILLAGE IN TAEPING VALLEY.
(*From a photograph by the late Capt. Watts-Jones.*)

THE NAIN TING VALLEY.
(*From a photograph by the late Capt. Watts-Jones.*)

bridges. They were much more level than usual, and easier to ride over; an ordinary Yunnan stone arch bridge being so high in the centre that to ride across one is much like riding up one side of the roof of a house and down the other. All these bridges are built either by private individuals, as a "work of merit" to be put to their credit hereafter, or by the various guilds of merchants who use the road. The Chinese Government never troubles itself about such trifles as roads and bridges, or public works of any kind; and no official would push through any necessary work unless he saw thereby a means of obtaining a satisfactory squeeze.

This Chinese idea of a "work of merit," though sometimes misplaced, as when they spoil a good path by paving it with cobbles and then never repairing it, is undoubtedly one of the best points in the national character. I shall always remember one instance I met with. On a path which I had to cross in the early winter, on the range between the Shweli and Salwen, I came across a small hut in which were two old men. We had been struggling up through the snow, which lay over 2 feet deep, and were fairly exhausted when we reached the top. We gladly accepted the invitation of the two old men to enter their hut and enjoy a cup of tea and a warm by their fire. There had been four of them, but two, who had given a bowl of rice and a pair of grass sandals to passers-by, had died. We offered payment, but it was refused—they would only accept our thanks; and we hurried downhill into a warmer valley with a grateful corner in our hearts for our two old hosts.

We reached the Yangtse at Shih-ku, where Gill left it. There is a very fine stone drum here, put up to commemorate a Chinese victory. Turning east, we passed through Lichiang-fu, leaving a magnificent snow range to the north. In order to get round this range the Yangtse makes a great northern bend. The Chinese maps had placed the northern limit of this bend some 60 miles too far south. Mr. Amundsen, a missionary, and M. Bonin, a French traveller, had noticed this, but the sketch-map which Mr. Amundsen gave Captain Davies was so inaccurate in other points that I for one did not believe that the bend extended so far north, till the following year I camped at the top of the bend myself, observed a latitude, and was satisfied. This is a good example of the value of accurate surveying.

Separating from my companion, we each made for Yunnan-fu by different routes. I crossed the Yangtse again by a fine suspension bridge. The roadway of planks was, however, in a very bad state—many planks were missing, and others rotten; I went across in fear and trembling, and was glad to get across. I was followed by two little Chinese boys, who chased each other as they came across, showing that their heads were better than mine. My mules picked their way across in a wonderful manner, encouraged by the shouts of their drivers

and the tinkling bell on the neck of the leader, who headed the procession across the bridge. We all met again near Yunnan-fu, where we had a snowstorm at the end of March. While the rest of the party went northwards towards the Yangtse, I waited for a month, trying to get a telegraphic longitude with Burma, but entirely failed. When the telegraphic line was not broken, the instruments would be out of order; when they were repaired, a clerk at some intermediate station would absent himself, and disconnect all the wires. Mr. Jansen, a Dane, who had actual charge of the telegraphs in the province, must have had a most trying time. The real head was a Chinese official, who had, of course, no knowledge whatever of telegraphs. His two previous appointments were district judge and in charge of the arsenal; of this latter job he also, of course, knew nothing. I hope he was a good judge. This is a good instance of how Chinese officials are appointed for their own advantage, and not for the good of the country. After leaving Yunnan-fu, I surveyed as much country as I could in a month, reaching the French frontier just as the rainy season commenced. During this season, from the end of May till September, trade is at a standstill, as most of the paths are impassable, and it is a very good time for travellers to quit the country; in October the country is still recovering from the rains. We entered Yunnan early in November, as soon as the roads were open and the cold weather had commenced. The hot weather commences generally in March, but we never found the heat oppressive except in the valleys. The greatest cold I registered was 17° Fahr. below freezing-point, in February, at an elevation of 7000 feet.

Having completed our season's work, I came out down the Red river through Tongking, with nothing worth recording except the great kindness and hospitality I received from French officers wherever I stopped on my way down.

Although we had accomplished a good deal of work, much still remained to be done. Accordingly, Major Davies and I started again in November, 1899, and for three months we surveyed the remaining important routes, avoiding as far as possible going over roads which we had already surveyed, but connecting with our previous surveys whenever we could manage it. One incident, though I laughed at it at the time, seems curious now by the light of later events. One day, on the march, I met a Chinese coolie whom I had employed to carry my theodolite the previous year. We entered into conversation through my interpreter, and presently I dropped out of the conversation, and the two conversed in low whispers. When they had finished I inquired what the man had been saying. "Sir," he said, "take my advice —get out of China as quick as you can. This year will be a bad year for foreigners in China." This was in January; the troubles in North China commenced in May.

YANGTSE RIVER AT SHIH-KU.
(*From a photograph by the late Capt. Watts-Jones.*)

RICE TERRACES, SHUNNING FU VALLEY.
(*From a photograph by the late Capt. Watts-Jones.*)

I arrived in Yunnan-fu on the same day that Major Davies reached Pu-eh-fu. This was by arrangement, in order to connect these places by a telegraphic longitude; then, while Davies moved up to Yunnan-fu, I marched by a roundabout way to Tsu-hsiung-fu, which was the last telegraph office I had succeeded in connecting with Burma the previous season. By simultaneous observations at these two places we completed our longitudes. We then by separate routes crossed the Yangtse into Sechuan, and headed north-west into Chinese Tibet. The officials, after protests that they had never heard of the places we wanted to go to, and that there were no roads there, and anyhow the roads were infested by robbers, let us go on our way. Our escort gradually dwindled away, then finally disappeared, and we were allowed to find our way westwards as best we could. There is little or no sign of Chinese authority in these semi-independent states. From Yunning a young lama was sent to guide me to Chungtien; even with his help I did not find the inhabitants very hospitable. Our lama would arrange for us to put up in a headman's house; the owner would say, "Stay, by all means, but there is a much better place a mile or so further up the valley, which will just suit you." On we used to go, to find no house at all of any kind. Having been tricked twice in this way, I knew better, and stayed in the best place I could find towards evening. Major Davies and I had agreed to meet on March 27 at Atuntzu. We had not expected that the snow would lie so deep on the passes, and on the 26th, when 22 miles from Atuntzu, I found myself blocked by snow, after making only 4 miles progress in two days. I was also in difficulties as to foot-gear, the most important part of a traveller's equipment. I had started with three pairs of boots, but some scoundrel had stolen a bag the day I left Bhamo, which contained, amongst other things, two right-foot boots. In two months I had nearly worn out my one pair, and then took to wearing Chinese sandals; these were, however, utterly unsuited for snow, and later on we all wore Tibetan boots. On the 27th, thinking Major Davies might be waiting in Atuntzu, I got a Tibetan guide, and with one of my Chinese coolies, by starting at 5 a.m., reached Atuntzu at 7 p.m., only to find Major Davies not there. I put up in a little house, where I was made most comfortable, rested the following day, as my men were suffering from snow-blindness. Returning to my camp in two marches, I met Major Davies on my arrival. He had met with worse snow than myself. Fortunately, a caravan went up the pass that day and trod down a path, which we followed next morning, and with great difficulty and the loss of two mules we managed to reach Atuntzu, where Major Manifold, I.M.S., joined us a few days later, and completed our party. We now sent back to Burma our spare baggage, surveyors, and Chinese followers, and started for the headwaters of the Irrawadi, following at first Prince Henry of Orleans' route. We were, however, stopped by the

snow in the pass leading from the Mekong valley to the Salwen; and as all passes westwards were in a similar condition, we spent a month usefully in marching up to Bat'ang and then down south again to Yerkalo, where we made our second attempt. This time we were stopped in a more exciting manner: our hovering about had put the Tibetans across the frontier on their guard. We reached the Mekong late one evening at the site of a rope bridge. These bridges are simple. A single rope runs each way across the river, the starting-point being higher than the point of arrival; on this are small wooden runners, to which the passenger or baggage is attached. On letting go, one's own weight carries one across.

We secured four small runners, and crossed ourselves, two servants, three Gurkhas, and some of our baggage; unable to obtain larger runners, we could not cross our mules, so left our remaining four Gurkhas to guard them. On our bank there was a small house, from which the hillside went towering up above our heads. We did not anticipate any trouble, as we were in Chinese territory, but while we were having dinner, we heard shouts from the further side; running out to see what was up, we went straight into a band of about twenty lamas, who had crept down and cut the rope by which we had been crossing. After a short rough and tumble they cleared, leaving, however, one of our Gurkhas very badly wounded—his head laid open with a stone, and a gunshot wound in his mouth. We had an exciting watch that night; expecting an attack, we made a barricade of sacks of salt. However, no attack was made, though we heard talking most of the night on the hillside.

Next morning, while we were trying to get one of our mulemen across to act as interpreter, the Tibetans, numbering about 400, lining the hillside above us and the spurs in front and behind, opened fire. This did no damage, and after firing an hour, to which we made no reply, a deputation was sent forward asking us to retire across the river. Encumbered by our wounded Gurkha, and unable to get our mules across, this was the only course open to us. As soon as we agreed, they came forward and, in a most friendly way, helped us to get across. Major Manifold's bedding fell off the rope in mid-stream, but the Tibetans fished it out of a backwater.

It being now too late in the year to make any further attempt to get across into the Salwen valley, owing to the imminence of the rainy season, we made up our minds to strike across Tibet to Tachien-lu, and so on to the Yangtse. The first part of our journey took us about a month, and a very rough time we had. Each pass we crossed cost us the lives of some of our mules, one of our Gurkhas was drowned in the river at Litang, and we were all fairly worn out when we reached Tachien-lu. The Gurkha who was drowned had been with me for over six months; they had all served us, as Gurkhas always do, faithfully and

well. Stolid little men! On the evening of the death of his comrade, the havildar came and saluted to make his nightly report, "All correct, sir, except one rifle, twenty rounds of ammunition, and one private soldier lost in the river." Another man, Maidan Singh, did me good service. One night I had dropped off to sleep, after having had fever all day, when I was awoke by a frightful row in the inn yard. Stepping out to see what was up, I found my mulemen engaged in an ugly fray with some other Chinese. Maidan Singh was standing by my side. "Maidan Singh," I said, "I had just got to sleep, when these scoundrels woke me with their noise." "Sahib," he said, "it is a very great shame." With that he went straight at the Chinese with a short heavy stick in his hand, knocked one senseless into the pig's trough, and drove the others out of the yard. Shortly after, as I was going to sleep again, I heard Maidan Singh alternately cursing the man in Hindustani for disturbing me, and, in very broken Chinese, trying to persuade him to drink some water, and soothing him.

Six very rough marches brought us to Yachau, meeting continuous streams of coolies carrying enormous loads of tea for Tibet, one man particularly carrying at least 350 lbs. and doing daily marches. We then floated 60 miles down stream on a raft to Chia-ting-fu, where we changed into a boat. Just as we were leaving, we received a message from a missionary at Yachau that he had received a telegram to the effect that the legations at Peking were being besieged, and that there was a general massacre of Europeans going on throughout China. This was cheerful news; we were nine armed men, and had some 1800 miles' river journey before we could reach Shanghai. Five days in this boat took us to Chungking, the only noticeable incident being that news of our coming had evidently been sent on by the officials, and at each town we passed, where our escort of two Chinese soldiers was changed, a boat was waiting in mid-stream, enabling us to change our escort without having to land, obviously to keep our passage down river unknown to the general populace. We approached Chungking, an enormous town, with an unpleasant doubt as to our reception. However, we found the situation there fairly satisfactory. The English Consul thought that we might escort the women and children down river, but after several days' delay, only two families could be persuaded to come. We reached Ichang down the Yangtse gorges without mishap, and from there our journey by steamer was simple.

Our journeys in China differed from most previous ones in that we were primarily surveyors; we have, therefore, been able to produce accurate maps of nearly the whole of Yunnan. We have so surveyed and examined the province that in future any one interested in the subject of railways in that part of the world can bring forward proposals based on better information and with more detail than the well-known consul in *San Toy*, who applied to a Chinese official for a

concession for a railway with a school atlas in his hand, saying, "Your Excellency, we propose to build a railway from here to there, with a tunnel here and a bridge there, a viaduct here and another tunnel there."

Before the reading of the paper, the PRESIDENT said: We have with us this evening one of the members of the survey party who has been exploring the province of Yunnan in China, a very interesting and valuable piece of work, and I feel sure that the paper he is about to read to us, with its illustrations, will be interesting. I now call upon Captain Ryder to read his paper.

After the reading of the paper:—

Major DAVIES: Having had the pleasure of being associated with Captain Ryder in two years' exploration work in Western China, I should like to say how very much our expeditions are indebted to the work done by Captain Ryder and by the native surveyors of the Survey of India who worked under him. I should also like to say a few words about the proposed Yunnan railway which Captain Ryder referred to. I think it is a scheme about which there has been a good deal of misapprehension, and on which a great many hasty judgments have been passed, based on very insufficient information. There have been several travellers in Yunnan during the last thirty years, many of them very clever and capable observers, and their opinions have been naturally much sought after by those interested in this subject; but I think it must be remembered they did not go out to Yunnan primarily for the purpose of investigating railway schemes, and it was not their special business to test the feasibility of a railway line through Yunnan. Also in some cases they have expressed opinions which have been very widely held, which really have nothing whatever to do with the proposed line. For instance, Mr. Baber of the Chinese Consular Service, whose writings combine in a marvellous manner the amusing and the instructive, makes two remarks which have been very much quoted. Speaking of the very high range between the Salween and the Shweli, he says, "If British trade ever adopts this track, I shall be delighted and astonished in about equal proportions." Further on, when discussing the subject more generally, he says, "By piercing half a dozen Mont Cénis tunnels and erecting a few Menai bridges, the route between Burma and Yunnan Fu might doubtless be very much improved." These two remarks, I think, have had great influence on people who have not studied the subject very deeply, and have induced them to think that the railway scheme is quite impracticable. I quite agree with the truth of both these remarks of Baber's; the only thing is, they do not apply to the railway at all—they refer to the road which goes westward from Momien through Ta-li-fu, whereas the present proposed railway comes into Yunnan from quite a different direction. Indeed, only half a page lower down Baber himself recommends as a probable line for a railway the very route which has now been adopted. To quote another instance of a rather poor argument against this railway. In a book, published as lately as last year, which devotes a chapter to the subject of railway extension from Burma into Yunnan, I came across the astounding statement that no coal has been found in Yunnan. Now, as a matter of fact, coal exists almost all over the province, and there are many large districts of Eastern Yunnan in which hardly anything is used for fuel but coal, which is all obtained from local mines. Of course, I quite understand that there may be differences of opinion as to the commercial value of a line through Yunnan, but I hope, in future, opinions will not be based upon misapplied quotations or upon such very inaccurate information as that which I have just quoted.

As to the work we did in Western China, the most important part of it is undoubtedly the preliminary railway survey which was carried out by Captain Watts Jones and Captain Hunter, both officers of the Royal Engineers. Captain Watts Jones, I am sorry to say, lost his life afterwards in the cause of exploration in China. The line they surveyed certainly presents great difficulties, but it is a practicable line that could be made. Besides the actual survey, the other members of the Expedition split up and took different routes, so as to get in as much work as possible, and made a fairly thorough exploration of the province of Yunnan. Of the eighty-four official cities of Yunnan, we visited all but three; so I think we may claim to have some knowledge of the province and of its resources. As to the mineral wealth of Yunnan, I do not think there has ever been any doubt. We certainly came across mines everywhere, and all sorts of mines—gold, silver, lead, tin, iron, copper, zinc, coal—and even with the present poor appliances that the Chinese have for working these mines, they make them pay. To give an instance of the sort of way in which they work their mines, one of our party who visited a gold-mine found them crushing the quartz with a sort of large wooden instrument, which is used in that country for husking rice. This was the only appliance they had for crushing gold quartz. The agricultural resources of Yunnan, too, are not to be altogether despised. Earlier travellers saw the province when it was just recovering from the effects of the Panthay rebellion, and I think all the members of our expeditions have at different times remarked to me that the poverty of Yunnan has been much exaggerated. As to whether this line will pay, it will be still rather an open question; but I think the Yunnan company, with the assistance of experts on matters of this sort, will now be able to decide whether it can be made as a commercial speculation or not. I regret that I cannot enter fully into the pros and cons of the Yunnan railway, as the question is largely a political one which cannot be discussed before this Society. There is, however, one suggestion about railways that I should like to make, and that is, that, as a beginning of railways in Western China, a line should be made from Chung-king or some other point on the Yangtse up to Ch'êng-tu, a very large city, the capital of Sechuan. This is a line that was originally proposed and surveyed by Captain Watts Jones, who had a high opinion of it, and thought it was a line that would pay at once. His opinion has now been endorsed by Major Manifold, who, with Captain Hunter, has lately been making some very thorough surveys through the whole of Central and Eastern Sechuan, and, if I might be allowed to suggest, I should say that would be the line that should be the first to be made of the railway lines in Western China. That once made, I think extensions of it would follow very easily. Sechuan is nothing like as hilly a province as Yunnan, and it is a very rich province. It is certainly the largest and most populous province in China; it is also considered the richest. I think, by beginning there, it would give the promoters of the scheme an idea of what railways in Western China would turn out like. And eventually it might be carried from there backward through Yunnan. The Yunnan railway is a very large business, and its construction may be delayed, but I cannot help thinking that a line which makes a great highway between India and China will eventually become an accomplished fact.

Sir Thomas Holdich: It is little that I can add to this interesting paper that we have heard to-night about a country in which, unfortunately, I have never travelled myself. But I am glad of this opportunity to welcome an officer from the department with which I was so long associated in India, who, more fortunate than his brother officer and survey comrade, Captain Watts Jones, has returned here to England to tell us the story of what he did in that distressful country,

China. There are one or two points that have struck me in relation to his work. In the first place, the extent of it, and, in the next place, the energy with which it was carried through. I think that if we remember back not so very long ago —well, within my memory—as to how much we knew of those countries which lie beyond the borders of India, we shall be struck at once with the immense extent in late years of those geographical surveys which have been carried out on scientific lines in the same manner that Captain Ryder with Major Davies have carried out their surveys in Western China. I can remember the time when the rugged line of frontier hills beyond the Indus not only bounded our horizon in that direction, but was absolutely at the time the limit of our geographical knowledge. We knew a little of what lay beyond them, but of what was in them we knew nothing. We knew something of the passes and the roads that ran through them, but of the hills themselves and of the villages we knew nothing. All that country where the present campaign is being carried on was an absolute blank. And now, how is it at present? We have carried these geographical surveys well into Eastern Persia, we have carried them to a junction with Russian territory on the north; and now, thanks to Major Davies and Captain Ryder, they extend well into China on the east. And yet, as Captain Ryder has told you, there is a very large future before us. We cannot say that we are within anything like measurable distance of the end. There is a large future for work of this nature; but the success of such survey work—the success of Colonel Rennie Taylor and Captain Ryder lately in another field in China, and of Major Close and Captain Jansen in the Transvaal, and of other officers whom I could mention in other parts of the world, all working on the same system—should, I think, at least assure us that that system is a sound one, and may safely be commended to the consideration of those many half-developed institutions which are rapidly springing up in England in the cause of geographical education. We were all much interested, of course, in hearing what Major Davies and Captain Ryder had to say about the chances of the connecting link between Burma and China in the matter of railways, and it is quite clear, I think, from what they have said, that, in their opinion at any rate, the engineering difficulties are not insurmountable. But they have said nothing about that larger question, which probably will interest the public very much in the future, as to whether it is not rather competition than construction which will bar the way to that connection ever being practically useful; whether the great waterways of China, which you have seen pretty well shown in the map which Captain Ryder has placed on the screen, whether that magnificent system of waterways and the easy possibilities of traffic which exists thereby, will ever be ousted or competed against by railway traffic—that is a very large question, perhaps too large for one to enter on here. But I would merely point out that, for a matter of that sort, it is well to turn to history, and I think it will be found that under similar circumstances elsewhere, at any rate so far as I have been able to see, wherever there has been competition between water carriage and railway carriage, under those circumstances the railway has invariably won. Well, gentlemen, I add no more; I merely wish to offer my congratulations to Colonel Rennie Taylor, to Major Davies, and to Captain Ryder for the splendid work that they have done in China, and to Captain Ryder for his most excellent paper to-night.

Mr. Fred. W. Carey: As I have only lately returned to England from that part of China which Captain Ryder has just described so clearly to us, I am able to say that his impressions of the country through which he travelled are what one would expect from an unprejudiced observer. My own journeys in Yunnan, during the last seven years, were confined to the southern and extreme south-

western portions of that province, *i.e.* the neighbourhood of Szemao and the Chinese Shan States; and I notice that Captain Ryder has said little or nothing about the extraordinary number and variety of hill tribes one meets with in Yunnan. During my stay there this was a subject that interested me very much. In every little market, as one travels along, one sees different tribes of hill people, wearing curious costumes and speaking each their own dialect. The Chinese, with their characteristic contempt for all alien races, can give no account of these numerous tribes. They distinguish each by some more or less opprobrious nickname, and are content. I remember the indignant answer I received from one Chinese gentleman when I asked him if he could speak the Shan language. "Do you take me for a wretched barbarian?" said he, or words to that effect.

I quite agree with Captain Ryder that the question of railways in Western China is a political one; and I think those who clamour for the construction of railways in China are apt to forget that it does not form part of the British Empire, and that such undertakings cannot be peacefully carried through until the Chinese themselves are convinced of their utility and necessity. That day, I venture to predict, is not so very far distant. Good roads are sadly needed in Yunnan, but road-making under official supervision would mean heavy taxes on the inhabitants and passing traders, and of the two evils the people at present prefer bad roads. With regard to the opium cultivated in Yunnan, I should like to make a few remarks. Many people in this country still hold the opinion that Indian opium is being forced on the Chinese against their will. They even believe that the cultivation of opium is prohibited throughout the Chinese Empire—indeed, I saw a statement to this effect quite recently in a well-known paper. This is not true, for in Yunnan, at any rate, the cultivation of the poppy has been encouraged by the officials for fiscal reasons. Chinese tradition states that opium-smoking first took its rise in that province, and one account says that opium has been produced there since the year 1760. The annual output at present is not far short of 5500 tons, whilst in the neighbouring province of Sechuan it is considerably more. As Indian opium (none of which ever finds its way into Yunnan) is handicapped by an exceedingly heavy import duty, it is not too much to expect that in a few years' time the native will oust the foreign article from the Chinese market. The opium question, as far as England is concerned, will then die a natural death. The opium bowl used by the Chinese originated in Yunnan, and even now the bowls manufactured at Linan, Mengtsz, and Semao are in great demand all over the south of China. Nearly every woman in Yunnan can spin cotton, and in every village one sees the old-fashioned wooden loom at work weaving cotton cloth, with which all the poorer classes clothe themselves. Before the Panthay rebellion the province was the centre of a big silk industry. Now, however, only a very little silk is produced in Yunnan. The Yunnanese are essentially of a most peaceful disposition, and I am sure Captain Ryder will bear me witness when I say that, as a rule, Europeans are treated with friendliness and respect. The country people I always found most hospitable, but particularly so when I was unaccompanied by any Chinese soldiers, who, when acting as escort to Europeans, in their zeal are apt to be too overbearing.

Dr. Logan Jack: Having recently come from pretty nearly the same country which was traversed by Captain Ryder and his companions, I should like to say first, that it is impossible to overestimate the value of such accurate observations as have been made by these gentlemen. There is nothing to be compared with them so far in the history of the exploration of China. In the adjoining room, I would invite the attention of members of the Society and visitors to a Chinese map of that district, especially of the province of Sechuan, and it will be seen

what a very great difference there is. That map is a mere diagram showing the relations of the principal rivers to one another, and showing them accurately, in so far that each river falls in on the right or left bank of the principal river as it ought to do; but a matter of 50 or 100 miles error is nothing whatever in Chinese maps. I do not think that this map we have seen to-night can be the one to which Captain Ryder has referred as that to which people who venture in future to discuss Chinese railway projects must turn, because in this map (which may, perhaps, only be an unfinished proof) not even the author's route is laid down. But that map is, no doubt, available. It is, I suppose, in the hands of the Indian Government, and also in the hands of the Yunnan Company, and will be issued in the course of time. When it is available, we shall have made an immense advance on anything which has hitherto been in our hands. I am aware that the question of railways from India to China is a question which becomes a political one, and therefore is not open to discussion in this Society; but the question of the practicability of railway construction is an academic one on which we may form our opinions, and we may be aided in forming such opinions by the surveys of Captain Ryder and his companions, when they are in our hands. I gathered from his remarks that there is at least one practicable, though difficult route, for a railway, and I gather from other sources that the railway being constructed by the French towards Yunnan is by no means deficient in engineering difficulties, and possibly they are as great on that line as they will be on the proposed line from the Irrawadi, which may be completed some day or other. I believe, for my part, that the Chinese themselves in that district are fully aware of the value of that trade-route to them. Again and again, in the last two or three hundred years, they have attempted to get what the Scotch lairds used to call "a grip of the sea;" that is, they have attempted to secure a port at Irrawadi at the head of the navigation. It was only a very few years before the British occupation of Upper Burma that the last attempt on Bhamo was made, and the Chinese actually held the town for some time under very romantic circumstances. As to the amount of traffic along those lines, I think it has been considerably underestimated. I met, in the course of a journey from Chengtu and up by the Tibetan border, down the Yangtse and across the Mekong and Salwen to the Irrawadi, enormous trains of mules and packers, hundreds of them two or three times a day, and each mule will carry at any rate a couple of hundred pounds. Ten of them will carry a ton, and that traffic is carried on in the face of all the difficulties which are inseparable from the indescribably bad condition of Chinese roads. These roads were paved hundreds of years ago in some instances, have been washed away and never repaired, and are carried without grading, by means of flights of steps, up and down the mountain-sides. In spite of all that, Western and American produce, in the shape of cotton, tobacco, condensed milk and kerosine, find their way over long distances into the interior of Sechuan, and if these difficulties were lessened —if a railway existed—then I have no doubt the volume of the trade would be enormously increased. As to the population, Yunnan was almost depopulated during the Mohammedan rebellion, and there are traces of that depopulation on every hand. But it is patent to every traveller who passes through the country that it is being repopulated by immigration from other provinces and by the natural increase in a country where there is plenty of room to spread out. Captain Ryder has told us that among the lamas he met with a great deal of hostility. I must confess that surprised me considerably, because my experience amongst the lamas, where I was often a guest of the priests, was very much more pleasant, and I found them extremely courteous and amiable. It has just struck me as possible that the display of a foreign armed force in this expedition may have had

something to do with the hostility which Major Davies and Captain Ryder and their party met with. At all events, in my case the lamas were exceedingly kind and courteous, and nothing could exceed their hospitality. I do not wish, at this late hour, to trespass further on your time, but I am glad to have had this opportunity of thanking Captain Ryder for this most interesting paper, and I am sure we shall all especially welcome those maps when we do ultimately see them.

Mr. JOHN HALLIDAY: I did not expect to be asked to speak this evening, and I really have very little to add to the able address which Captain Ryder has given us, and which Major Davies has also given us, and Dr. Jack. I suppose I am called upon as I have something to do with the Yunnan Company, which is practically one of my babies, and it has paid all the expenses of this Expedition, and even the wear and tear of the survey instruments which were used. I would impress upon the audience that they should not take their ideas of Yunnan from those photographs. You will have observed the terraces were as precipitous as the mountains all round the valleys, showing that the photographs do not do justice to the country as a railway country. The surveys which we have from Captain Watts Jones, in which he has delineated the superficial and the horizontal outline of the country, show no very bad country whatever, except a few miles between Yunnan-fu and the Yangtse valley. It is not more difficult than the railways in the Rocky mountains. There are no impracticable engineering problems. The biggest mountain which stands in our way at present is the Chinese Government, for they have never confirmed the concession which our Government imagined they had secured. Four or five years ago, when this company was started and the survey began, the Foreign Office, the War Office, the India Office, and the Burma Railways, all combined to encourage us to make the survey. But I am afraid there is very little chance of any railway being made for many years. The trade, however, is increasing very largely, and if we could even get a cart-track—a practicable road—the increase of trade would be enormous. At present, as Dr. Jack has told us, the mules have practically to go up and down stairs—up the one side of the hills and down the other. It is a wonder they get along at all. I have only to thank Captain Ryder and Major Davies for their interesting address, and I also thank you, Mr. President, for asking me to say a few words.

Captain RYDER: There are very few points in the discussion that want answering, as everybody seems much of the same opinion. I should like to mention, with reference to what Dr. Jack has said about the map, that it was only intended absolutely and entirely as an index map to give any one who attended here an idea of what I was going to talk about. It is not a map as we would call it; it is a guide. Our maps, as we survey them, I suppose, would cover the whole of this green cloth. And about our routes being marked; if we had marked our routes—well, I travelled 4000 miles, and the other officers did much about the same—as our routes crossed and recrossed, if we had marked them, there would not have been room for anything else much on the map. Besides the maps that the Government of India are publishing of our surveys, the Geographical Society here are reducing our surveys to a fairly workable scale, and I hope they will be published soon. With regard to the remark by Mr. Halliday about the expenses of the Expedition, I think it right to say that, so far as I was concerned, my expenses, and the expenses of those under me, were entirely paid by the Government of India. So I think they should receive some credit for the results of our expeditions.

The PRESIDENT: Now, it only remains for us to express our thanks for the

interesting paper we have listened to this evening. For more than thirty years back we have had accounts of this most interesting part of China from such men as Lieut. Garnier and poor Captain Gill, and Cooper and Colquhoun, and, above all, from Mr. Baber; and I think it is a very remarkable thing that the whole of these pioneers were most distinguished geographers, and six of them were Gold Medalists of the Society, so that at intervals during that long period we have had our interest aroused in Yun-nan by very capable and very able geographers. Now at last we have received a scientific survey of the greatest value and importance, and we have certainly to thank the Yunnan Company for its liberality, and also the Indian Government. Through their means, Major Davies and Captain Ryder have executed this admirable survey. I am sure you will all wish to vote your thanks to Captain Ryder for his paper, which has given rise to such an interesting discussion, and also for the admirable way in which he has illustrated it.

EXPLORATIONS IN MEXICO.*

By CARL LUMHOLTZ.

My explorations and researches in north-western Mexico extended over a period of more than five years. On my first expedition I travelled under the auspices of the American Geographical Society of New York, and the American Museum of Natural History of New York; but later I have been in the service of the last-named institution alone. My researches have been mainly of an ethnological and archæological character; but as the country explored is very little known, and partly unknown, I may hope that what I can tell in the limited space of time allotted to me may prove of some interest to you.

Between the years 1890 and 1898 I made altogether four expeditions to Mexico. My main field was the western Sierra Madre, which may be considered as a continuation of the Rocky mountains, and stretches through the greater part of Mexico and down through Central and South America. In this way a practically uninterrupted chain of mountains is found from Behring strait to Cape Horn. The Sierra Madre del Norte offered a specially wide field for scientific researches. The northernmost part of this Sierra, from the border of the United States south about 250 miles, was until recent times under the undisputed control of the Apaches, those wild Indians whose hands were against every one, and every one's hands against them. It was only after the American General Crook, in 1883, had subdued these savage rovers that it had been at all possible to make scientific researches in those regions. But small bands of Shis Inday ("the men of the woods") were still left, and my party had to be made strong enough to meet all difficulties that might be threatened from them.

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* Read at the Royal Geographical Society, December 15, 1902. Map, p. 220.

As my expedition in 1890 was the first which would enjoy the comparative safety of that district, I thought that the cause of science would be best served by taking with me a number of scientific men and collectors in various branches. Prof. W. Libbey, of the University of Princeton, N.J., with his laboratory assistant, represented physical geography. The late Mr. A. M. Stephen was our archæologist, having as assistant Mr. R. Abbott. Messrs. C. V. Hartman and Mr. C. E. Lloyd were botanists; Mr. F. Robinette, zoological collector; and Mr. H. White, the mineralogist of the expedition.

With a party of altogether twenty-six men and nearly a hundred animals, I, in the winter-time, succeeded in crossing the Sierra Madre from Nacori, in Sonora, to Casas Grandes, in Chihuahua, and there for ten months excavations were conducted at San Diego, near the famous ruins of Casas Grandes.

On my second expedition I followed the Sierra Madre southwards from my crossing-line, in the beginning through uninhabited regions, but later passing the country of the Tarahumares and the Northern Pimas. The Tarahumare Indians of the Sierra Madre live in certain parts of the country to a considerable extent in caves, and as they are anthropologically one of the least-known tribes in Mexico, I decided to study them. As this could not easily be done with an expedition that was still quite large, I gradually discharged my followers until at last I remained alone with a few Mexicans.

The rich field for ethnological studies which Mexico offers irresistibly called me back to new researches, and I entered on my third and longest expedition, which lasted from March, 1894, to March, 1897. At the outset I kept two or three Mexicans with me, but I soon found that the so-called civilized Indians, or even primitive Indians, were my best companions; for not only did their mere presence assist me in gaining the confidence of their fellow-tribesmen, but they were themselves a constant and valuable material for study. As on my former expedition, I remained for months with different tribes, discharging my companions, and living among the Indians. I spent altogether a year and a half among the Tarahumares, and up toward a year among the Huichols. In 1898 I revisited both these tribes. Always at first the natives would resist me, and I have in more than one tribe been considered as a man-eater, subsisting on women and children, whom I killed by the camera. Besides, they attributed to me designs on their lands. They have learned to be distrustful of the white man, which nobody can wonder at when remembering how little the whites have left them of their once large countries; but I succeeded gradually in gaining their friendship and their confidence, specially by my ability to sing their songs, and by always treating them justly.

In this manner I gained a knowledge of these people which in no other way could have been obtained. When my stock of civilised

provisions gave out, after having been for five or six months without connection with the outer world, I was restricted to the food that the Indians could give me. Game is not very plentiful in Mexico, except in the extreme north, and the traveller cannot depend upon getting food by his gun. As in Australia, my favourite drink was water and honey. It is both refreshing, and gives one an appetite when having to eat monotonous dishes.

In the northernmost part of Sierra Madre del Norte, which at present is uninhabited but for some colonies of Mormons in the extreme eastern and western parts, there are few traces of habitation; they consist mainly in small terraces of stone, generally across small valleys, and which probably served agricultural purposes, as the Tarahumares, though rarely, use somewhat similar trincheras at the present time. Rude fortifications may also be seen. More important are ancient cave-dwellings, the houses being of practically the same kind as those found in similar circumstances in the south-western part of the United States. Many of these were carefully examined by my expedition. Over five hundred jars were excavated near Casas Grandes, beautifully decorated in designs that resemble somewhat those of the Pueblo Indians, but in reality are intermediary between the culture of these people and that of the valley of Mexico.

From the northern limit of the Tarahumare country to the end of the Sierra Madre del Norte antiquities are very rare indeed. A few caves with rude habitations or other signs of having been inhabited may be seen; also sometimes circles of upright stones placed solidly in the ground and protruding some 6 inches or more.

I visited altogether nine tribes, and brought back a large material to illustrate their ethnical and anthropological status, besides extensive information with regard to their customs, religion, myths, and traditions. A more or less complete linguistic material from the different tribes was secured, among which should be mentioned the now nearly extinct Tubar (a dialect of the Nahuatl language). Seventy airs and melodies were recorded mostly through graphophone. Over two hundred skeletons and skulls were procured, samples of hair, etc. A unique collection of ancient large terra-cotta figures from Iztlan, in Jalisco, should be mentioned, as well as a hitherto unknown kind of pottery from the neighbourhood of Guadalajara, a kind of encaustic ware with excellent colours. Finally may be mentioned, as results of my expeditions, a collection of about fifty-five mammals, of which one, *Sciurus Apache*, was new to science, about one thousand birds, and a large botanical collection which yielded twenty-seven new species, among them a very beautiful pine tree with whip-like branches (*Pinus Lumholtzii*).

It has been the purpose of my expeditions to throw light on the relations between the ancient cultures of the valley of Mexico and that

of the Pueblo Indians of the south-western part of the United States, to give a correct picture of the ethnical status of the Mexican natives of to-day, and incidentally at the time of the conquest, as well as to throw light on certain phases in the development of the human race. Most of what I have to tell regards a part of the republic of Mexico which never is visited by tourists, and which even for most of the Mexicans is a *terra incognita*.

The Sierra Madre del Norte is a vast mountainous country from 6000 to 8000 feet elevation, sometimes rising to 9000. Toward the north tracts of rough country may be seen, for instance, around the once famous mine Guaynopa, north-west of Temosachic, where the landscape appears as a wave of ridges and peaks, pinnacles of reddish conglomerate adding to the wildness of the landscape. Generally, however, the sierra consists of low hills and valleys, with a small llano now and then. The largest llano in the Sierra Madre del Norte is near Guachochic, in the central part of the country of the Tarahumares, being 12 miles long and 3 miles wide. Very characteristic of the landscape are the so-called barrancas, precipitous abysses which traverse the mighty mass of the sierra like huge cracks running nearly from east to west. In the country of the Tarahumare—that is to say, the state of Chihuahua—there are three very large barrancas. They are designated as Barranca de Cobre, Barranca de Batopilas, and Barranca de San Carlos. The Sierra Madre rises so gradually in the east—for instance, when entered from the direction of the city of Chihuahua—that one is surprised to be suddenly almost on top of it. The western side, however, falls off more abruptly, and presents the appearance of a towering ragged wall. In accordance with this general trait of the mountain system, the beginnings of the barrancas in the east are generally slight, but they quickly grow deeper, and before they disappear in the lowlands of Sinaloa they sometimes reach a depth of from 4000 to 5000 feet. Of course they do not continue equally narrow throughout their entire length, but open up gradually and become wider and less steep. The traveller, as he stands at the edge of such gaps, wonders whether it is possible to get across them. They can in a few places be crossed, even with animals if these are lightly loaded, but it is a task hard upon flesh and blood.

Besides these large barrancas, which impede the traveller in the highlands and necessitate a course toward the east, there are innumerable smaller ones, especially in the western part of the range, where large portions of the country are broken up into a mass of stupendous rock-walled ridges and deep chasms. A river generally flows in the barrancas between narrow banks, which occasionally disappear altogether, leaving the water to rush between abruptly ascending mountain-sides.

The sierra is covered with vast pine forests, never as yet touched

by the woodman's axe, and journeying on these highlands the traveller finds nothing to remind him that he is on the southern latitudes except an occasional glimpse of an agave between rocks and the fantastic cacti, which, although so characteristic of Mexican vegetation, are comparatively scarce in the high sierra.

Along the streamlets which may be found in the numerous small valleys, we meet with the slender ash trees, besides alders, shrubs, willows, etc. Conspicuous in the landscape at lower elevations is the madroña (*Arbutus Texana*), with its pretty strawberry-like edible berries. Flowers are scarce, but in the north the carmine-red Amaryllis may be encountered among others. It is a perfect treat to meet now and then, in the dry and sandy country, and at such a chilly elevation, this exquisitely beautiful flower, which is here appreciated only by the humming-birds. Edible plants, *Mentha*, *Chenopodium*, *Cirsium*, for instance, are at a certain time numerous.

A little further down we meet with an agave called amole, whose gigantic flower spike is well-nigh a botanical wonder. Once I decided to measure one of them. The spike, without the stalk, was 15 feet 8 inches long, and at the thickest part 31 inches in circumference. After counting the flowers on one portion, I estimated that the entire spike bore at least twenty thousand beautiful blossoms each as large as a tulip. It required two men to carry it, and as they walked along they were followed by humming-birds, which remained industriously at work in what they doubtless considered their own private garden.

Animal-life is not particularly plentiful in the sierra, still deer, bears, and mountain lions are fairly common, and there are many kinds of squirrels and rats. The jaguar (*Felis onza*) is found now and then on the summits of the barrancas. Eagles, hawks, turkeys, blackbirds, and crows are the most noticeable birds. There are many species of woodpeckers, the most remarkable of which is the greatest woodpecker in the world (*Campephilus imperialis*), which are found in pairs throughout the Sierra Madre del Norte.

The climate in the sierra, although not so pleasant, on account of the constant winds, is extremely salubrious, the heat never exceeding 97° Fahr., while the nights are deliciously cool. Lung diseases are here unknown. When I asked an old American doctor in the mining town Guadalupe y Calvo, Chihuahua, about his experience in regard to the health of the people, he said, "Well, here in the mountains they are distressingly healthy. Despite a complete defiance of every sanitary arrangement, with the graveyards, the sewers, and a tannery at the river's edge, no diseases originate here. When cholera reached the mountains some years ago, nobody died from it. The people simply took a bath in Mexican fashion, and recovered." Down in the barrancas, however, where the heat often becomes excessive, the climate is far from healthy, and I have seen even Indians ill with fever and ague,

contracted during the rainy season. The western coast of Mexico, especially from Tepic southward, is very unhealthy, and during my stay there several Mexicans died from pernicious malaria.

Between these two extremes, on the slopes of the sierra toward the warm country, at an elevation of 5000 feet, I found the most delightful climate I ever knew. It was like eternal spring, the air pure, and the temperature remarkably even. There is a story of a Mexican woman who, settling in that part of the country, broke her thermometer because the mercury never moved, and she therefore concluded that it was out of order.

The tribes I visited were, counting from the north, the Northern Pimas, the Tarahumares, the Tubars (a now nearly extinct people, who spoke a dialect of Nahuatl), the Tepehuanes, the Coras, the Huichols, the Tepecanos, the Nahuas of the west coast of Mexico, and the Tarascos of Michoacan. These Indians are very much of similar physique, medium sized, strong, and healthy, the colour of the body of a light chocolate-brown colour, and the hair jet black and straight. They have the same kind of food, raising maize and beans, which is their main source of subsistence. The advent of whites has, to a certain extent, modified their life through the introduction of cattle and sheep. The cattle is never killed expressly for eating purposes, but is used as sacrifice at the rain-making feasts, and after an insignificant part has been given to the gods, the rest is partaken of by the people. The cattle is considered just as valuable as the deer, the turkey, and other animals that are used as sacrifice to the gods. From the hide sandals are made. The wool is manufactured by the women into blankets and girdles of ever-varying patterns. The clothing is generally made from cheap cotton cloth bought from the Mexicans. The plough and the ox have largely taken the place of the primitive agriculture, though the ancient mode of cultivating the fields may yet be found in vogue in certain tribes—the cutting down of the brushwood, which later is burnt, and the planting of the corn in holes made by a stick in the ground, the holes being covered up with earth by the help of the foot. Bows and arrows are still the arms of most of these tribes. None of the Mexican tribes, to my knowledge, chastise their children, who grow up to be very independent, and have not much affection for their parents. The Tarahumare boy may even strike his father or mother. The mothers, however, are very fond of their children, who in early years are very charming, and never too much forward.

To the casual observer the native appears dull and heavy, so much so that at first it would seem hopeless to get any intelligent information out of him; but on better acquaintance it will be found that the faces of Mexican Indians have more variety of feature and expression than those of the whites. At the same time, it is true that the individual does not show his emotion very perceptibly in his face. One has to

look into his eyes for an expression of what passes in his mind, as his face is not mobile; nor does he betray his feelings by involuntary actions. If he blushes, as he sometimes does, the colour extends down the neck, and is visible in spite of his dusky skin. Laughter is never immoderate enough to bring tears to the eyes. Like the Mexicans, the Indians beckon with their hands by making downward movements with their fingers. The principal trait of their character is distrust, but they are intelligent, have keen senses, and if treated well will comply with agreements made with them. The principal faults of these Indians are that they have a propensity to appropriate things that strike their fancy, though they never stole anything from me. The Tarahumare, however, does not cheat in bargains until he is taught so by the Mexicans. These tribes, besides, do not tell the truth unless it suits them to do so.

They all speak of the sun as "father," and the moon as "mother," and the pivot round which their religion moves is rain, or, rather, how to prevail upon the gods so as to make them liberate the clouds, which they want to keep for themselves. The gods are supposed to be angry with man and jealous, but the way to appease their wrath is dancing, sacrificing, singing, and innumerable ceremonies. Rain is what these people first of all pray for, next long life and luck. As regards the Huichols this may seem strange, because they have in their country a regular, though not particularly heavy wet season. But owing to the steepness of their primitive fields, most of the falling rain runs off without penetrating the soil, therefore almost incessant rain is needed to make the crops grow. If it stops raining for several days, the young maize plants begin to be scorched by the heat of the sun. The Mexican Indians certainly recognize the immortality of the soul, but they are afraid of the dead, whom they consider anxious to have their relatives follow them into the other life. The dead, therefore, are thought to be endeavouring to make the survivors ill to keep them company, besides being jealous of the things they left behind. These Indians, therefore, make several feasts in the course of a year after the death of a person in order to drive him away for good.

Though, to use the expression of the late distinguished American ethnologist, Mr. Cushing, "all Indians are tarred with the same stick," there is considerable difference to be found in the various tribes, both in regard to physical and mental habits, habitations, customs and habits, and beliefs, not to mention the diversity of language. While nothing, for instance, will disturb the equanimity of the Tarahumares, the Tarascos of Michoacan are of quite a choleric temperament. I have seen babies getting into a furious rage against their mothers, who on their side become equally excited; but after a few minutes the whole thing is over. This same quick temper may be one reason of the curious frequency of jaundice in a certain part of the Tarasco country.

The Tarahumares have a great number of games and pastimes all the year round; among the Huichols not one is found. Many more dissimilarities in the tribes studied by me might be mentioned.

The two tribes of this mountainous region that are of special interest, because least affected by civilisation, are the Tarahumares and the Huichols. The Tarahumares live in wooden structures, but, in their land of weather-worn porphyry and inter-stratified sandstone, natural caves are met with everywhere, in which the people find a convenient and safe shelter. Although it may be said that houses are their main habitations, still the Tarahumares live in caves to such an extent that they may be fitly called the American cave-dwellers of the present age.

These cave-dwellers are in a transitory state, most of them having adopted houses and sheds; but many of them are still unable to perceive why they should give up their safe and comfortable natural shelters for rickety abodes of their own making. Some of them live permanently in caves, but most of them only temporarily so.

In front of the entrance to the cave there is generally a wall of stone, or of stone and mud, raised to the height of a man's chest, as a protection against wind and weather, wild beasts, etc. The cave is fitted up just like the houses, with grinding-stone, earthen jars and bowls, baskets, gourds, etc. The fire is always in the middle, without hearth or chimney, and the jars in which the food is cooked rest on three stones. A portion of the ground is levelled and made smooth for the family to sleep on. As often as not there are skins spread out on the floor. Sometimes the floor space is extended by an artificial terrace in front of the cave. In a few cases the floor is plastered with adobe, and I have seen one cave in which the sides too were dressed in the same way. Generally there are one or two storehouses in the caves, and these constitute the chief improvement.

These cave-dwellers are not related to the ancient cliff-dwellers in the south-western part of the United States and Northern Mexico. Their very aversion to living more than one family in a cave, and their lack of sociability, mark a strong contrast with the ancient cliff-dwellers, who were by nature gregarious. Although the Tarahumare is very intelligent, he is backward in the arts and industries. Tarahumare pottery is exceedingly crude as compared with the work found in the old cliff-dwellings, and its decoration is infantile as contrasted with the cliff-dwellers' work. Moreover, he is utterly devoid of the architectural gift which resulted in the remarkable rock structures of the early cliff-dwellers. These people, as far as concerns their cave-dwelling habits, cannot be ranked above troglodytes.

The endurance of the Tarahumare is truly phenomenal. A strong young man carried a burden of over 100 lbs. from Carichic to Batopilas, a distance of about 110 miles, in seventy hours. While

carrying such burdens they eat nothing but pinole (corn toasted and ground), a little at frequent intervals. With their dogs they pursue deer for days through rain or snow, until they finally corner it and shoot it. By the Mexicans these people are sometimes employed to run wild horses into the corral. The Indians rest a little at night, but they keep their horses on a pretty constant move, until they at last are brought into the corral, the Indians not showing any fatigue, but the horses thoroughly exhausted. They love to feel warm, and they may often be seen lying on their stomachs in the sun. On the other hand, they also endure cold unflinchingly. On a cold winter morning, when there are a few inches of snow on the ground, many a Tarahumare may be seen with nothing on but his blanket fastened around his waist, pursuing rabbits.

They certainly do not feel pain in the same degree as we do. On this point any collector of hair can easily satisfy himself. So much importance being attached to the structure of the hair, I made a collection from different individuals. They were willing enough to let me have all the samples I wanted, for a material consideration, of course; but the indifferent manner in which they pulled the hair from their heads, just as we should tear out hairs from the tail of a horse, convinced me that inferior races feel pain to a less extent than civilised man. I once pulled six hairs at a time from the head of a sleeping child without disturbing it at all; I asked for more, and when twenty-three hairs were pulled out in one stroke, the child scratched its head a little and slept on.

Though quite ingenious in devising many kinds of traps for birds and animals, the Tarahumares hunt squirrels in the most primitive way —by cutting down the tree on which an animal is discovered. Sometimes it will escape when the tree falls, and then the man has to cut down another tree, and thus he may go on felling as many as ten trees before he can bag his game—not a very substantial reward for a whole day's work.

Fish are killed by a small spear shot from a diminutive bow, but a more profitable way of catching fish is by poisoning the water by two species of agave.

Among the intoxicating drinks of these people should be mentioned the native beer, called in Mexican Spanish "tesvino;" it is produced from maize, looks like milky water, and has quite an agreeable taste, reminding one of kumyss. To make it, the moist corn is allowed to sprout; then it is boiled and ground, and the seed of a grass resembling wheat is added as a ferment. The liquor is poured into large earthenware jars made solely for the purpose, and it should now stand for at least twenty-four hours; but inasmuch as the jars are only poorly made, they are not able to hold it very long, and the people take this responsibility on themselves. A row of beer-jars turned upside down in front of a

house is a characteristic sight in the Tarahumare region. It should be noted, however, about this intoxicant, as well as about all other Indian beverages, that they are not indulged in as a pastime, but are part of their religion, and are thus only enjoyed for a certain purpose—to gain good crops, health, life, etc. In the same way, in ancient times, the well-known drink "pulque," among the Aztecs, was restricted by law to their religious observances.

For a barbarian, the Tarahumare is a very polite personage. In his language he even has a word, "rĕkó," which is the equivalent of the English "please," and which he uses constantly. In spite of this, he is not hospitable; the guest gets food, but there is no room for him in the house of a Tarahumare. A visitor never thinks of entering a house without first giving the family ample time to receive him, and good manners require him to stop some fifteen or twenty yards off. In order not to embarrass his friends, he does not even look at the house, but remains sitting there gazing into vacancy, his back or side turned toward the homestead. Should the host be absent, the visitor may sit there a couple of hours or so; then he will rise and go slowly away again.

Husband and wife never show their affection in public, except when drunk. Parents kiss their little ones on the mouth and on the stomach, and the youngsters express their love for each other in the same way. This tribe is the only one where I found love-songs, but the custom of the country requires the girl to do all the courting. She is just as bashful as the young swain whom she wishes to fascinate, but she has to take the initiative in love-affairs. The young people meet only at the feasts, and, after she has gotten mildly under the influence of the native beer that is liberally consumed by all, she tries to attract his attention by dancing before him in a clumsy way up and down the same spot. But so bashful is she that she persistently keeps her back turned toward him. She may also sit down near him and pull his blanket, and sing to him in a gentle low voice a simple love-song. When she desires to bring matters to a focus, she begins to throw small pebbles at the chosen one. If he does not return them, she understands that he does not care for her, and the affair ends then and there. But if he throws them back at her, they are at once betrothed.

The Tarahumare woman bears her child alone, and next day she works as usual as if nothing had been the matter with her. On the fourth day the mother goes down to the river to bathe, leaving the little one exposed in the sun at least an hour, that Father Sun may see and know his child; the baby is not washed until it is a year old.

Among the many games and sports of the Tarahumares should be mentioned foot-races. No doubt these people are the greatest runners in

the world, not in regard to speed, but endurance. A Tarahumare will easily run 170 miles without stopping. The propensity for running is so great that the name of the tribe alludes to it. Tarahumare is a Spanish corruption of *ralámari*, the meaning of which, though somewhat obscure, may doubtless best be given as "foot-runners," because *rālá* certainly means "foot." The race is always between two localities. A peculiar feature is that the men toss along a small ball as they run, each party having one of their own. These balls are about 2½ inches in diameter, and carved from the root of the oak. The foremost runner kicks it with the toes of his right foot, so as to make it bound along as far as 100 yards, and he and all the men behind him follow in the same trot as before. On the day of the race the forenoon is spent in making bets, the managers acting as stakeholders. These people, poor as they are, wager their bows and arrows, girdles, head-bands, clothes, blankets, beads, balls of yarn, corn, and even sheep, goats, and cattle. The stakes of whatever nature are tied together—a blanket against so many balls of yarn, a girdle against so many arrows, etc. They run steadily hour after hour, mile after mile, and good runners make 40 miles in six or eight hours. The public follows the race with great enthusiasm, the interest growing with each circuit. The wives of the contestants throw tepid water over the shoulders of the runners, by way of refreshing them. As darkness comes on, torches of resinous pine wood are lighted and carried along to illuminate the path for the runners that they may not stumble, making the scene one of extreme picturesqueness as these torch-bearers, demon-like, hurry through the forest.

The Huichols, who are living in the southern part of the Sierra Madre del Norte, in the state of Jalisco, are to the ethnologist a most remarkable tribe. They number about 4000 souls, and their country is only about 40 miles long and 20 to 25 miles broad, and, being exceedingly mountainous and difficult of access, it has left the people in a very primitive condition. They were only conquered by the Spaniards in 1723, and the missionaries who followed in the wake of the victorious troops established four churches. To-day their churches are in ruins, and no priests are living among them; the impress made on their religion was exceedingly slight, and probably they are the most primitive tribe in Mexico, practically living in the same conditions as when Cortez first put foot on Mexican soil.

It would carry me too far to relate all the difficulties I had in entering the Huichol country, which I approached from the west. Obstacles arising from the prejudice and fear of the natives threatened to prevent me from arriving at the Pueblo of San Andres, my immediate goal. However, I successfully made my way, and though some of the Indians ran away into the forest at the unusual sight of my expedition, most of them received me in stolid silence, evidently accepting my baneful

presence as something they were powerless to avert. Quite a number of Indians had come to the village to attend a rain-making feast. My arrival did not prevent the feast from coming off, as the Indians never postpone a ceremony. Torrents of rain were already falling before the performers started their ceremonies, but this in no wise abated their fervour in singing, their object now being to prevent the rain from stopping. My wishes were just as eager to the contrary, as the rickety shed which had been assigned to me, though the best available, was by no means waterproof. It is trying, in any case, to have to make one's self at home against the wishes of one's host, and the inclemency of the weather much intensified the discomforts of the situation. I became reconciled to my fate, however, by the really beautiful singing of the leader. As a matter of fact, I have never, in any primitive tribe, heard such good singing as among the Huichols. The steady downpour of rain, punctuated by fitful flashes of lightning, formed a wierd and fantastic accompaniment to the sympathetic singing, which came to me through the pitchy darkness of the night like a voice from fairyland. It sounded different from anything I had ever heard among Mexican Indians or elsewhere, and it was as novel as it was enchanting.

The name *Huicholes* is a Spanish corruption of Víshálika, the word signifying "healers," a name they fully deserve, as about one quarter of the men are medicine men, or shamans. These Indians are related to the Nahua people, and while the Aztec Empire came to a tragic end nearly four hundred years ago, the humble Huichols have maintained themselves to the present day in their mountain fastnesses, and, like a fossil among nations, form a most interesting subject for study. They are very bright, and have better memories than the Mexicans, but their morals are somewhat affected by their cunning. They are quicker to invent a lie than any Indians I have met. A Huichol knows how to look out for himself, but is kind-hearted and hospitable. They have no personal courage, and prefer assassination of a stranger to meeting him in open fight. At the feasts, when intoxicated, the men may get into quarrels. Like the fighters of Homeric days, they first abuse each other violently with words. But unlike his forerunner of old, the Huichol, when entering a bout, very sensibly hands his weapon to his wife.

Taking it all in all, their great gift of music, combined with their ready response to emotional influences, the immense wealth and depth of their religious thought, and their ingenuity in expressing it pictorially cannot help but fascinate the observer. They are more religious than any people I have met, practically their whole life being one of devotion to their gods. There are eighteen temples in the country, which, like their houses, are round, made of stone, and covered with thatched conical roofs. There is, besides, a great number of sacred caves and

god-houses, filled with an immense number of ceremonial objects of various kinds, through which they express their prayers to their gods.

Space does not allow me to enter into any details regarding their religious system with its extensive symbolism that throws light on the ceremonial objects and religious conception of the ancient Aztecs.

I must, however, before closing, in a few words touch upon a peculiar plant-worship which the Huicholes have in common with the Tarahumares, namely, the cult of certain species of small cacti. Among the Tarahumares there are several varieties of cacti worshipped and feared, species of *Mammilaria* and *Echinocactus*.

Among the Huichols there is only one or two varieties of cacti worshipped, namely, *Lophophora Williamsii* and *Lophophora Williamsii*, var. *Lewinii*. In the United States they are called mescal buttons, and in Mexico *peyote*. Strange to say, although the Huichol Indians live many hundred miles south of the Tarahumares, with whom they are neither related nor connected in any way, they apply the same name, hikuli, to these mescal buttons, which are found on the central plateau of Mexico. This plant is supposed to talk and sing, and to feel joy and pain. When taken it exhilarates the human system, and allays all feeling of hunger and thirst; it also produces colour-visions. When fresh it has a nauseating, slightly sour taste, but it is wonderfully refreshing when one has been exposed to great fatigue. Not only does it do away with all exhaustion, but one feels actually pushed on, as I can testify from personal experience. In this respect it resembles the Peruvian coca; but, unlike the latter, it leaves a certain depression, as well as a headache. Although an Indian feels as if drunk after eating a quantity of hikuli, and the trees dance before his eyes, he maintains the balance of his body even better than under normal conditions, and he will walk along the edge of precipices without becoming dizzy. Another marked effect of the plant is to take away temporarily all sexual desire. This fact, no doubt, is the reason why the Indians, by a curious aboriginal mode of reasoning, impose abstinence from sexual intercourse as a necessary part of the hikuli cult.

The plant has distinct medicinal properties, and is applied externally to cure snake-bites, burns, rheumatism, etc. With the Indians, however, it is mainly an object of worship, and a regular cult is instituted whose main purpose is to promote the health of the tribe as well as to bring rain. The Huichols undertake, in October, pilgrimages to a locality situated near San Luis Potosi, consuming forty-three days going and coming. On the return of the hikuli-seekers to their own country, they at once begin preparations for the hikuli-feast. An important condition for the feast is to secure a certain number of deer, and to have cleared the fields for the cultivation of corn for the ensuing year. The pilgrimage and preparations for the feast may consume altogether four

months, during which they are pledged to abstinence, do not partake of salt, and do not wash except with water brought from the country of the hikuli. The plant is often eaten fresh, slices being cut off much as we would eat an apple; but at a feast a kind of liquor is made by grinding the plants and mixing them with water. The main feature of the feast is a peculiar kind of dancing by men and women, whose faces are painted with various designs with a symbolic meaning.

As regards the fate of the tribes of the Sierra Madre del Norte, it can ultimately be but one—their absorption into the great nation to which they belong. The vast forests and mineral wealth of those regions cannot always remain the property of my dusky friends; the weaker must succumb to the stronger, and the Indians will ultimately all become Mexicans. True, the state of development which the tribes of the Sierra Madre did attain is not beyond the pale of primitive barbarism, owing to their environment and conditions of life; but the country has no reason to regret the inoculation of aboriginal strength and thought.

The Indian of Mexico is treated well by those in power, and he is considered a citizen. The influence upon the Mexican nation of the tribes that had risen to a certain stage of civilisation at the time of the conquest has been great and beneficial. Pure-bred Indians have become prominent as governors, generals, and clergymen. Honest, lion-hearted Benito Juarez, who guided the republic through its most severe crisis, was a pure-bred Zapotec Indian; and I hardly need to remind you that the present head of the Mexican Republic, President Porfirio Diaz, who has a certain amount of Mixtec blood in his veins, is not only a great man in his country, but one of the great men of our time.

Before the reading of the paper, the PRESIDENT said: There was no Council meeting this afternoon, and the candidates, of whom there are a large number, will be elected at the next meeting of the Council. We have with us this evening a very experienced Norwegian traveller, Dr. Lumholtz, who has been several years in Australia, and since that he has been studying the wild tribes in the northern parts of the Sierra Madre, in Mexico. He is going to give us this evening what I am sure you will find a very interesting paper. I now call upon Dr. Lumholtz.

After the reading of the paper:—

Dr. A. C. HADDON: Dr. Carl Lumholtz has added a new chapter to the history of man. The native tribes in these parts of Mexico were hitherto unknown to anthropologists, and it is very fortunate that they had such an able and sympathetic observer as Dr. Lumholtz. Dr. Lumholtz started life as a zoologist, and, like many other zoologists who travel, he found that the highest animal, or that animal which considers itself the highest, was perhaps quite as worthy of study as are birds, reptiles, and fish; thus he was gradually won from beasts to man, and I think the change has been a good one. Unfortunately, I have not been to Mexico, but this time last year I was in New York City, and I studied the very extensive collections that Dr. Lumholtz brought over with him; and it seems as if Dr. Lumholtz has imbibed something of those great ideas which are so

characteristic of the other continent, as he has brought home an immense mass of material. He not only collected widely, but wisely; and his collections were not the mere ransacking of the people, which is so often the case with those who call themselves anthropologists, but they consist of human documents which teach a very great deal. I heard a criticism in America to the effect that he describes his results in too great detail. But I take it that students of anthropology in five hundred or a thousand years' time will not regret the detail of travellers. They will often wonder how it was we said so little about what we had seen in foreign parts. The great danger is for us to write too little, and not too much, upon what we have seen, because the rapidity with which all anthropological data are disappearing is simply appalling, and the students of man in the future will be only too thankful for every scrap of information that we at the present time can give them; and if we do not give it with the amplitude that Dr. Lumholtz has done they will deservedly blame us. What Dr. Lumholtz says about the religious feeling of these people may strike you perhaps as being somewhat strange, but it is perfectly true; and if he had only amplified that point he could easily have proved his statements. The whole life of the people is one of worship, and it is extremely interesting to see how the different characteristics of a country react on the psychological life of people; this is also marked in the social and religious life of the Pueblo Indians. Dr. Lumholtz has studied particularly the symbolism of these Indians, and in his publication one sees that every little detail and ornament has its meaning. With us decoration and ornament are usually meaningless. We live in an æsthetic world which may please our artistic sense, but which has for us very little significance; whereas you will find amongst primitive people what we consider as mere ornament and only pleasing to the eye, has to them a definite and distinct meaning. Civilization loses much of what is a great element in the life of savage people. Very few of us can realize the amount of sentiment and of religious suggestion that is conveyed by what we regard as mere ornament. Not only has this ornamentation a religious significance, not only does it recall ideas to them, but the ornaments themselves are actually prayers; so, as Dr. Lumholtz says, speaking of the embroidery on their shirts, the people themselves are clothed with prayer—every object is practically a prayer. Miss Alice Fletcher, who has lived many years among some of the American Indian tribes, has also found that there is amongst them a religion which was totally unknown to the ordinary white man. It is only when you can get their confidence—and you can only get it by sympathy—that you find that the savage scalp-hunting Red Indian has a religion which is, from a religious point of view, an extremely high and philosophical one. It is only when we get sympathetic observers like Dr. Lumholtz that we can form any conception of the inner life and feelings and aspirations of these different races. The savage has never had a fair chance till the present day. We regard him as having no culture, and because he has no culture we think he has no moral or religious ideas, and the reason why we think so is because we do not know. If we studied them as carefully as Dr. Lumholtz has done, we should find that there was precious little difference between most savage people and ourselves, with the exception, perhaps, that the savage people would be found to be more honest and more religious, and to act up to their religious convictions more than we do. I am sure every one of us has thoroughly enjoyed this lecture of Dr. Lumholtz's, and not the least valuable part, perhaps, of the lecture was those charming songs that he gave us. I have heard the songs of Australians, of Papuans, and of various tribes in Borneo and elsewhere, but I must say I never heard such musical songs as those given by Dr. Lumholtz. I only hope that this will not be the last occasion upon which we shall have the pleasure of listening to and welcoming him.

Dr. GADOW: I regret not being able to make any remarks on Dr. Lumholtz's interesting paper, for a very good reason, namely, that those parts of Mexico I have recently visited are not the same as those visited by him. But when he spoke about these people and showed us these wonderful photographs, I was struck with the fact that the tribes I have seen about the Isthmus of Mexico did not bear the slightest resemblance to those people whose photographs we have seen on the screen. He made the remark that they suffered from two faults—they did not speak the truth, and they steal. Well, to my surprise I found that during several months of sojourn at different places on both the Pacific and Atlantic sides, we never lost any article, and when I asked some of the men occasionally, how it was they could leave their things about and they didn't get taken, they said, "No, it is not the custom here." I am sorry I cannot make any further remarks.

The PRESIDENT: You will agree with me that we have listened to a paper of very great value, as well as of great interest. I call to mind that this country of the Sierra Madre was the scene of some of the most adventurous exploits and discoveries of the early Spaniards, and there can be nothing more important in ethnology than to be able to compare the manners, the customs, and arts of the isolated Indians of the present day with anything that may have been said of them when the country was first discovered. I call to mind the name of the first man who ever visited the Sierra Madre country from Europe, Cabeza de Vaca. It is a strange name. It is curious that any one should be called "head of a cow," and I am tempted to mention the reason that his ancestor got that name. It was at the time that the Mohammedans were making their last great effort to gain supremacy in Spain, and when the kings of Castille, Navarre, and Aragon united to fight them and drive them back. The Almohade sultan had formed a great camp behind the mountains of Tolosa, and when the Spanish army advanced, all the narrow passes were found to be full of Mohammedan warriors. Then a shepherd boy, named Alhaja, came to the kings and said, "I can show you a way across the mountains which is not guarded by Mohammedans, where I feed my sheep." The kings commanded that he should lead the van under the Lord of Biscay into this pasture, and it was agreed that he should place the head of a cow, which had lately been killed and eaten by the wolves, in the opening of the *barranca* or ravine leading to the pastures which opened on to the plain on which the Mohammedans were encamped, to guide the rest of the army. So they marched up, and a great battle was fought, called the battle of Las Navas de Tolosa, which in 1212 A.D. settled the question for ever whether the Christians or Mohammedans were to be predominant. And afterwards King Alphonso sent for the shepherd boy and knighted him, telling him that his name was no longer to be Alhaja, but that it was henceforward to be Cabeza de Vaca, "the head of the cow," in memory of the sign he had placed at the entrance to the ravine. And the explorer, the discoverer of this part of the world, on his mother's side, was descended from the shepherd boy. When Narvaez went to conquer Florida, Cabeza de Vaca was with him. They abandoned their ships and followed along the coast. Nearly all perished, there being no one but Cabeza de Vaca, three other Spaniards, and one negro left. They pressed on with that extraordinary intrepidity which the Spaniards of those days displayed. Cabeza de Vaca advanced from one tribe to another, slowly, but resolutely, determined to go on until he reached the other sea. He was eight years amongst these Indians who have been described to you this evening by Dr. Lumholtz, and after eight years, by the same means as Dr. Lumholtz has used, conciliatory means, he ended by becoming the friend of the Indians, and making them think he was a *shaman*, or great medicine man, and he succeeded almost alone in passing through and across these mountains down on to the

Pacific side, and at last reached a settlement of the Spaniards. He reported his discoveries at Mexico, and another expedition was sent under a Franciscan, and then another under Coronado, the governor of New Galicia, and they penetrated not only into this country which has been described to you, but further on until they reached the country of the Zuñis. Well, we have these three narratives: we have the narrative of Cabeza de Vaca, I think, if I remember rightly, written by himself; we have the narrative of the Franciscan Niza; and we have the narrative of Coronado, most ably written by another hand, and giving an account of the Indians. We have these three narratives, and it would be, of course, of the greatest interest to compare all they say about the Indians of this country with the discoveries respecting those isolated tribes which have been recently made after a study of several years by our friend Dr. Lumholtz. If he will allow me to say so, I should be inclined in some respects to compare him with Cabeza de Vaca; he has shown the same resolute determination in the face of considerable difficulties from the Indians, and in the face of considerable physical difficulties he has shown that determination to do what he intended to do which was shown by Cabeza de Vaca. He has also shown the same anxiety to make friends, and the same power of conciliating the people among whom he was, which enabled Cabeza de Vaca to cross the continent, and which enabled Dr. Lumholtz to make these most remarkable and valuable researches among the Indians. We have to thank him to-night for opening up to us a subject of the greatest interest, which I am sure was quite new to most of those present; we have to thank him for the admirable way in which he illustrated his paper; and we have to thank him for those beautiful songs, showing what powers these people have as musicians as well as in other arts which they practise. I am sure, therefore, you will all join with me in a very cordial vote of thanks to Dr. Lumholtz for his most valuable paper.

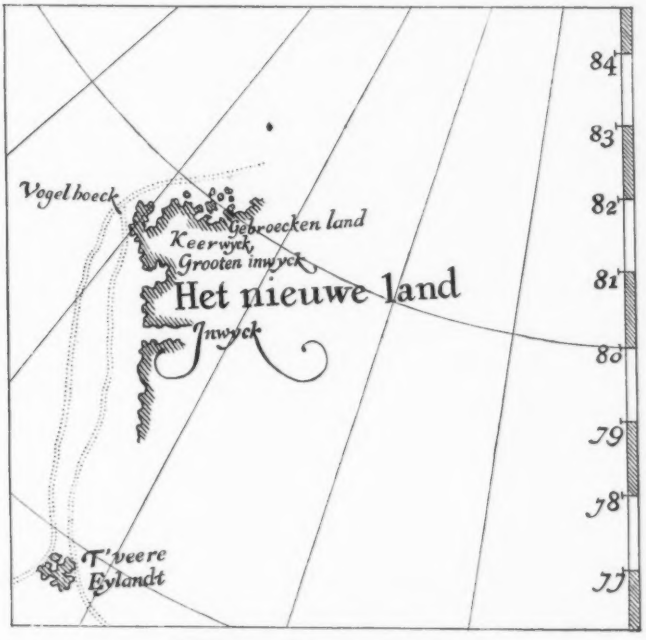
HOW SPITSBERGEN WAS DISCOVERED.

By Sir MARTIN CONWAY.

On May 18, 1596, two Dutch ships sailed from Vlieland, near Amsterdam, on a voyage destined to be famous in the annals of adventure and discovery.* In one ship Willem Barendszoon was chief pilot; the captain was Jacob Heemskerke Hendickszoon, proudly described on his monument as "the man who ever steered his way through ice and iron." In the other, Jan Corneliszoon Rijp of Enkhuizen was captain and supercargo, Arend Martenszoon of Amsterdam pilot. The chief honour of the voyage has always been given to Barendsz, but Heemskerke should not be forgotten, for he was a great sailor. He commanded the Dutch fleet at the victorious battle of Gibraltar in 1607, where he met his

* The authorities for this voyage are an extract from Barendsz's own log, printed in Hessel Gerritz' 'Histoire du pays nommé Spitsberg,' translated in the Hakluyt Society's 'Three Voyages of W. Barents' (1876), p. xvii.; and De Veer's Journal of the voyage, translated in the same book, p. 70. See also De Jonge's 'Opkomst,' etc., vol. i. pp. 23–26; and S. Müller's 'Geschiedenis der Noordsche Compagnie,' p. 43, note. The course of the ships is marked on Barendsz's own chart, which was engraved in 1598.

death. His monument stands by one of the central pillars of the Oude Kerk in Amsterdam. On June 9 the two ships made Bear island, and the following day eight men landed from each ship, Barendsz and Rijp being of the number. Next day, again "going on land, wee found great store of sea-mewes egges upon the shoare, and in that island wee were in great danger of our lives: for that going up a great hill of snowe, when wee should come down againe, we thought we should all have broken our neckes, it was so steep; but wee sate upon the snowe (*ons naers*) and slidde downe, which was very dangerous for us to breake



SPITSBERGEN, FROM BARENTSZ' CHART.

both our armes and legges, for that at the foote of the hill there was many rockes, which wee were likely to have fallen upon, yet by Gods help wee got safely down againe. Meane time William Barendsz sate in the boate, and sawe us slide downe, and was in greater feare than wee to behold us in that danger. . . .

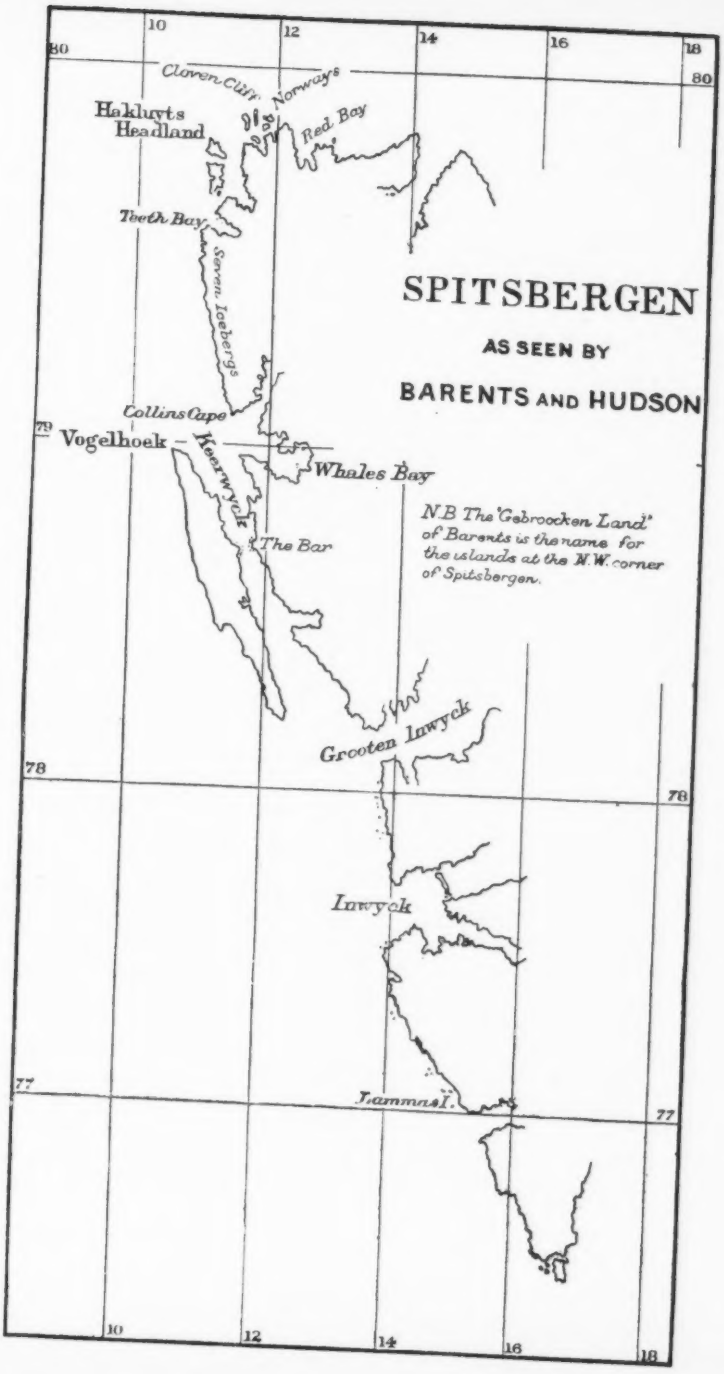
"The 12th of June in the morning, wee saw a white beare, which wee rowed after with our boate, thinking to cast a roape about her necke; but when we were neare her, shee was so great that wee durst not doe it, but rowed backe again to our shippe to fetch more men and

our armes, and so made to her againe with muskets, hargubushes, halbertes, and hatchets, John Cornellysons men comming also with their boate to helpe us. And so being well furnished of men and weapons, wee rowed with both our boates unto the beare, and fought with her while foure glasses were runne out (two hours), for our weapons could doe her little hurt; and amongst the rest of the blowes that we gave her, one of our men stroke her into the backe with an axe, which stucke fast in her backe, and yet she swomme away with it; but wee rowed after her, and at last wee cut her head in sunder with an axe, wherewith she dyed; and then we brought her into John Cornelysons shippe, where wee fleaed her, and found her skinne to be twelve foote long: which done, wee eate some of her flesh; but wee brookt it not well. This island wee called the 'Beare Island.'"

They sailed from Bear island on the 13th, in a northerly direction. At noon on the 14th they fancied they could see land to the north, but were not certain. At noon next day they were in lat. 78° 15′ N.—that is to say, off the mouth of Ice fjord, but probably some way out to sea. On the 16th they met the ice-pack north of Spitsbergen, and sailed along it eastwards for 44 miles (north-east and south-east). At noon on June 17th they were in lat. 80° 10′; steering south-south-west, they came in sight of land, which was visible for about 32 to 36 miles, trending almost from west to east. "It was high land, and entirely covered with snow." Undoubtedly the north coast of Spitsbergen between Hakluyts headland and the mouth of Liefde bay was what they saw, and this was the memorable day of the island's discovery, though De Veer makes the 19th the date of this event. On the 18th they were in lat. 80° N. They sailed through ice westwards along the land till noon on the 20th. On the 19th they were in lat. 79° 49′ according to De Veer. At noon on the 20th the western point of the land lay south-south-west, 20 miles distant. They sailed towards it, and "came close to a large bay (Red bay) which extended into the land towards the south." They made another attempt to get away to the north-west, but were driven back by the ice, and so, late on the 21st, both ships came to anchor at the mouth of Fair haven. "At the east point of the mouth," says Barendsz, "was a rock, which was, moreover, split, a very good landmark;" he obviously refers to Cloven cliff. "There was also a small island or rock, about $1\frac{1}{3}$ (? miles) from that eastern one. On the west point also was a rock, very near." It would, therefore, appear that he anchored between Cloven cliff and Vogelsang. Here or hereabouts, in lat. 79° 50′, Barendsz set up a post with the arms of the Dutch upon it. The post remained standing till 1612, when the English carried it away.*

Next day they "took in ballast of 7 boatsful of stones, thus much

* The fact is mentioned in a resolution of the States-General, April 16, 1615.


SPITSBERGEN
AS SEEN BY
BARENTS AND HUDSON
80
10
12
14
16
18
Cloven Cliff
Norways
Hakluyts Headland
Red Bay
Tooth Bay
Seven Icebergs
Collins Cape
79
Vogelhoek
Whales Bay
The Bar
N.B The 'Gebroocken Land' of Barents is the name for the islands at the N.W. corner of Spitsbergen.
Grooten Iawyck
78
76
Iawyck
77
Tramm I.

because our ship was little ballasted." A great fight with a bear followed, and then they explored Fair haven with a boat, and found the Norway islands and several good anchorages. On one island where they landed, they "found many red geese-egges, which we saw sitting upon their nests, and drave them from them, and they flying away cryed, 'red, red, red;' and as they sate we killed one goose dead with a stone, which we drest and eate, and at least 60 egges, that we tooke with us aboard the shippe. . . . These were *Rotgansen* (Bernacle geese), such as come into Holland about Weiringen (near the Texel), and every yeere are there taken in abundance, but till this time it was never knowne where they hatched their egges; so that some men have taken upon them to write that they grow upon trees in Scotland that hang over the water, and such egges as fall from them downe into the water become yong geese and swimme away; but those that fall upon the land burst in sunder and come to nothing: but this is now found to be contrary, and it is not to be wondered at that no man could tell where they breed their egges, for no man that ever we knew had ever beene under 80°."

Next day, the 23rd, the weather being very clear, they went out of the bay and rounded Hakluyts headland "to seek how far the coast could extend itself." They "could not perceive the end of the land, which extended itself S. ½ E., 28 miles, as far as a high and mountainous cape [? Knottie point], which looked as if it were an island." They returned and cast anchor in the same place, and at midnight found by observation that they were in lat. 79° 42′, which is the latitude of Danes island.*

On the 24th they sailed southward down the west coast or wall of the island, as De Veer calls it. "The land," says Barendsz, "was for the greatest part broken, rather high, and consisted only of mountains and pointed hills, for which reason we gave it the name of 'Spitsbergen.'" † Captain Rijp, giving evidence before the magistrates of Delft, said, "We gave to that land the name of Spitsbergen, for the great and high points that were on it." They did not, however, conceive it to be an island, but only part of Greenland, as De Veer expressly states.

On the 25th they entered and cast anchor in a bay, which must have been Magdalena bay, for it was 40 miles north of Vogelhoek. They rowed up the bay, on the south side of which was a low cape, the English burying-ground of later days, with a cove behind it, "having shelter from all winds," and "a little creek like a harbour." They

* 79° 42′, says De Veer, who gives the elements of the calculation. Barendsz's log says 79° 24′, but this is doubtless a misprint.

† Not Spitzbergen, as it is commonly but incorrectly spelt. The name is Dutch, from *spits*, "a point."

landed, and found two walrus' teeth "that waighed sixe pound," and many smaller teeth, so they named the inlet Teeth bay. On this occasion they appear to have taken formal possession of the land for Holland, and to have deposited among some rocks a record of their visit enclosed in a box.*

On the 26th they sailed into the north end of Foreland sound, but found that it was blocked at some distance in by the banks afterwards called the Barr. There was ice on the shallows, so they were forced to turn back, for which reason they called the sound Keerwyck.† On Barendsz' map this bank is marked as an isthmus, joining the Foreland to the mainland, but from his log it is evident that he knew there was water over the bank. The next day was calm, but on the 28th they emerged again from the sound and rounded the north end of the Foreland, to which they gave the name Vogelhoek, from the great number of birds about, which flew against the sails. On the 28th they sailed southward along the west coast of the Foreland, "which was very mountainous and sharp, with a beautiful shore." At noon the latitude was observed to be 78° 20′. Later they passed the mouth of Ice fjord, "a large bay, which extended itself in the land east-north-east, and was on both sides high and mountainous;" afterwards they saw Bell sound, "in which was much ice under the land." These are the bays named Grooten Inwyck and Inwyck on Barendsz's chart. They continued southward along the land, till at noon on the 29th they were in lat. 76° 50′ N. The ice now drove them out to sea. At noon on the 30th they were in lat. 75° N., and on July 1 they sighted Bear island once more.

It is evident that between Barendsz and Rijp there had been frequent differences of opinion as to the course to be steered. Rijp was always for going further west, Barendsz hankered after the east. Their differences now culminated, and they decided to separate and go their own ways. Barendsz sailed to Novaja Zemlja, where, after following up the west coast and rounding the north-east point, he was shut in by ice at Ice haven on August 27, and forced to winter. On the 30th the ship was nipped in the ice, "whereby all that was about and in it began to crack, so that it seemed to burst into a hundred peeces, which was most fearfull both to see and heare, and made all the haire of our heads to rise upright with feare." They now began carrying things ashore, where they set up a tent, and presently, having found much driftwood, determined to build a hut. The carpenter died on September 23, leaving them sixteen in number, whereof some were always sick. By the end of October the house was finished, and they had moved into it.

* See the affidavits printed by Müller, 'Geschiedenis der Noordsche Compagnie,' p. 362.

† See A. Cz. Herman's affidavit of 1630, printed in Muller's 'Geschiedenis der Noordsche Compagnie,' p. 363.

During the winter only one man died, though many suffered from scurvy, but the fresh meat they secured by trapping foxes saved them. When daylight returned they "made (April 3) a staff to plaie at Colfe,* thereby to stretch our jointes;" and it is again recorded (May 15), that they went out "to exercise their bodies with running, walking, playing at colfe, and other exercises, thereby to stirre their joynts and make them nymble." They had many contests with bears, and once, like so many other early arctic travellers, they ate a bear's liver, which made them all sick so that their skins peeled off. All through the month of May they waited, hoping to be able to bring their ship away, but it was not possible; so they made preparations for leaving in two open boats, and Barendsz, who was very ill with scurvy, wrote a letter, which he put into a bandoleer and hanged up in the chimney, stating briefly the nature of their doings and sufferings in that place.

At length, on June 13, they drew Barendsz and another very sick man to the shore, and embarked in the two open boats, fifteen men in all. They rowed round the north-east point of Novaja Zemlja, and began making their way with great difficulty down the west coast. On the 20th, near Cape Comfort (east of Cape Nassau), "Claes Andriezoon began to be extreme sick, whereby we perceived that he would not live long, and the chief boateson came into our scute and told us in what case he was, and that he could not long continue alive; whereupon Willem Barendsz spake and said, 'Methinks with mee too it will not last long;' and yet we did not judge Willem Barendsz to be so sicke, for we sat talking one with the other, and spake of many things, and Willem Barendsz looked at my little chart, which I had made touching our voiage, and we had some discussion about it; at last he laid away the card and spake unto me, saying, 'Gerrit, give me some drinke;' and he had no sooner drunke but he was taken with so sodain a qualm, that he turned his eies in his head and died presently, and we had no time to call the maister out of the other scute to speak unto him; and so he died before Claes Andriesz, who died shortly after him. The death of Willem Barendsz put us in no small discomfort, as being the chiefe guide and onely pilot on whom we reposed our selves; but we could not strive against God, and therefore we must of force be content." Thus died the discoverer of Spitsbergen, and leader of the first polar expedition that wintered so far north. A third man died a few days later.

With incredible toil the weak survivors, all more or less scurvy-

* It may interest golfers to be reminded that many representations of their game exist in works of art by Dutch painters of the seventeenth century. I remember two, both dated 1654. One is a drawing of golf-players by Jan van de Capelle in a sketch-book (which also contains drawings by Rembrandt and other contemporary artists), which belonged to Madame Kneppelhout in 1894. The other is an etching by Rembrandt (B. 125), representing the sport of "Kolef."

stricken, laboured through the ice, till the 19th, when they came into open water near Cross island. Sailing now more quickly southward, they met two Russian Lodyas on the 28th, and obtained a little relief from them. Shortly afterwards they found scurvy-grass, which did them all incredible good, but the scurvy was not entirely cured till much later. Sailing straight across the sea, they reached the mouth of the Petchora on August 4. On September 2, after voyaging 1600 miles in their open boats, and undergoing innumerable hardships, being often brought to the verge of starvation, they joined three Dutch ships at Kola, on the White sea, whereof, by a strange chance, one was under command of the selfsame Jan Cornelisz Rijp from whom they had parted thirteen months before at Bear island.

Of Rijp's doings after parting from Barendsz, we possess, unfortunately, the most meagre accounts. Hessel Gerritsz, in his 'Histoire du pays nommé Spitsberge,' only says, "Rijp again set sail (*i.e.* from Bear island) towards the north, and came, after marvellous accidents from ice and winds, to the spot where they had anchored for the first time in 80° (*i.e.* to Fair haven). He had also been again at Vogelhoek, and he returned from thence with the intention of rejoining Barendsz." Pontanus, in his 'History of Amsterdam,' says (p. 168), "that Rijp pretended that they ought to retrace their steps till 80°." Rijp himself, in his affidavit, only says that "they returned to the same place where they had been at first," and that, from Bear island, they "took their course to the north round" Spitsbergen. There is every reason to believe that they merely retraced their former course, and made no new discoveries, the ice-pack near Fair haven keeping them back. If any discoveries of importance had been made they would assuredly have been included in the chart of 1598, whereas nothing is there indicated, and Rijp's returning ship is merely depicted in the neighbourhood of the Faroe islands. De Veer says that Rijp left them to "saile unto 80 degrees againe; for hee was of opinion that there he should finde a passage through, on the east side of the land that lay under 80 degrees"—that is to say, that he did not intend to explore eastward till he had reached Fair haven.

From Kola, Rijp carried the twelve survivors safely home to Holland. They entered the Maas on October 29, rowed to Delft, then to the Hague, and from thence to Haarlem; "and upon the first of November about noone got to Amsterdam, in the same clothes that we ware in Nova Zembla, with our caps furd with white foxes skins. . . . Many men woundred to see us, as having estemed us long before that to have bin dead and rotten. The newes thereof being spread abroad in the towne, it was also carried to the Princen Hof, where the noble lords, the Chancellor, and the Ambassador from the most illustrious King of Denmark, Norway, Goths, and Wends, were then at table. For the which cause we were presently fetcht thither by the Schout and two of the lords of

the town, and there in the presence of the said lord ambassador and the burger masters we made rehearsall of our voyages and adventures."

This memorable and tragic expedition became famous in the annals of Dutch navigation, and is still rightly regarded as one of the glories of Holland's heroic days. Hendrik Tollens wrote a poem upon it. De Veer's account of it was widely circulated, translated into many languages, and has been frequently reprinted, twice in English during the last century. Not till the year 1870 was Novja Zemlja circumnavigated; Captain Johannesen accomplished this feat, and visited the east coast of the island, when he approached but did not find Barendsz's winter quarters. In 1871 another Norwegian, Captain Elling Carlsen, of Hammerfest, took his sloop into Barendsz's Ice haven on September 7. On the 9th he discovered the ruins of the hut (16 metres long by 10 metres broad), and brought away from it a number of relics, which had been buried and preserved under a thick accumulation of ice. Measures were successfully taken by the Dutch Government to obtain possession of these treasures. They were presented to Holland by their purchaser, Mr. Kay.* Captain Gundersen was the next to visit Ice haven in 1875. He found and brought away some old charts and manuscript translation of the narrative of Pet and Jackman's voyage of 1580. Finally, in 1876, Mr. Charles Gardiner sailed in his yacht *Glow-worm* through Matotchkinshar to Ice haven, and made a thorough examination of the ruins of Barensz's hut. He brought back one hundred and twelve more relics, which he generously presented to the Dutch Government.† All these objects were brought together, and form the interesting collection now exhibited in the museum at Amsterdam.

BELLINGSHAUSEN'S ANTARCTIC VOYAGE.‡

By HUGH ROBERT MILL, D.Sc.

EIGHTY years is a long time to wait for an authentic account of one of the most remarkable and important of antarctic voyages; yet until the publication of this slim volume, only the few students of these matters who have an intimate acquaintance with the Russian language were able

* J. K. J. De Jonge: Nova Zembla: De Voorwerpen door de Nederlandsche Zeevaarders na hunne overwintering aldaar in 1597, achtergelaten en in 1871, door Kapitein Carlsen teruggevonden. The Hague, 1873. 8vo.

† J. K. J. De Jonge: Nova Zembla: De Voorwerpen door de Nederlandsche Zeevaasders na hunne overwintering, op Nowaja-Zemlja bij hun vertrek in 1597 achtergelaten en in 1876, door Chs. Gardiner, Esq., aldaar teruggevonden. The Hague, 1877. 8vo.

‡ F. von Bellingshausens Forschungsfahrten im Südlichen Eismeer 1819–1821. Auf Grund des russischen Originalwerks herausgegeben vom Verein für Erdkunde zu Dresden. Leipzig: S. Hirzel. 1902. Pp. 204.

to get at the full details of the voyage of the two Russian corvettes in 1819–21. Unfortunately the full details have still to be sought in Russian, for the 200 octavo pages now published by the Dresden Geographical Society concentrate a narrative which spreads over 730 quarto pages of the Russian original. We greatly regret that this condensation was necessary, the more because we find in the preface that Prof. H. Gravelius, to whom the translation is due, dictated a full translation of Bellingshausen's two volumes to a shorthand-writer, which was equivalent to 640 octavo pages, and then proceeded by judicious excision and compression to bring the mass of matter within the means of the Dresden Geographical Society to publish, "the fourth redaction—and reduction—of the original translation." This is a work of no mere local or temporary interest, and we wish that it had been possible to have secured the co-operation of larger and wealthier societies, in more countries than one if that were necessary, so that the whole text might have been laid before the people of Western Europe. Perhaps it is not too late to secure a full translation; perhaps we might hope that some one of the several wealthy promoters of antarctic research might give the few hundreds required for a full translation into English, illustrated with a map—which is wanting here though the original work had one—and helped in places by notes.

Yet we do not wish to detract from the immense credit due to Prof. Gravelius and the Dresden Society, for their book is most judiciously condensed, and, as far as we can test it—that, unfortunately, is but a little way—very accurately rendered. It is certainly of engrossing interest and, despite the remote date of the voyage, of refreshing novelty. We have, in fact, no criticism to offer, except that it might have been stated whether the dates are according to new or old style; they are given as in the original, and so must follow the Russian calendar. In referring to dates in this notice, we quote from the book, and eleven days must be added to make them correspond with the dates marked on Bellingshausen's track on the map given in the 'Antarctic Manual.' The temperatures might perhaps have been reduced to a common scale—some are cited in Réaumur, others in Fahrenheit degrees; but here again the translator follows the author. Without further comment we shall summarize the main facts as to the voyage, calling special attention to those parts least noticed in the brief and unsatisfactory accounts with which we have had to be satisfied hitherto.

The Russian emperor, probably on the advice of Baron de Traversey, the head of the Russian admiralty, resolved early in 1819 to send out two expeditions of two ships each simultaneously towards the two poles. The idea was imperial in its world-embracing magnitude, and autocratic in the speed with which the four vessels were selected, equipped, manned, and despatched.

The Emperor Alexander I. visited the vessels when they were

ready to sail, and entertained the captains at the palace before their departure, impressing on them his desire that they should act in the friendliest way towards all people, civilized or savage, whom they should meet. On July 4, 1819, the four ships sailed from Kronstadt, the *Otkritie* and *Blagonamerenni* bound for the Pacific to enter Bering strait and make the north-west passage; the *Vostok* and *Mirni* for a voyage in the south supplementary to that of Captain Cook. The *Vostok* was a corvette built at St. Petersburg in 1818 of unhewn pine-wood; she was copper-bottomed, and her masts and spars cut down to fit her for heavy weather. Her dimensions are given as—length, 129 feet 10 inches; breadth, 32 feet 8 inches; and depth, 9 feet 7 inches. These figures are accurately transcribed from the original, but the important qualifying word "of hold" after "depth" is not translated; the draught of water must have been greater. The second was a vessel of 530 tons, built of the same material as the *Vostok*, and, under the name of the *Ladoga*, intended for the navigation of the Baltic; she was, however, specially strengthened. The emperor changed the name to *Mirni*, *i.e.* "Pacific," and her dimensions were—length, 120 feet; breadth, 30 feet; and depth (this time probably draught of water), 15 feet. She was a much slower sailer than the *Vostok*, and the narrative is full of records of the leading ship having to shorten sail in order to allow the *Mirni* to come up with her. Captain F. von Bellingshausen (who had made a circumnavigation with Krusenstern) had received his appointment to command the expedition on board the *Vostok* on April 24 at Sebastopol; it took him a month to reach St. Petersburg, so that his time for preparation was barely six weeks. The command of the *Mirni* was given to Lieut. Lazareff, who had served in the British navy for four years as a volunteer officer, and had since commanded one of the ships which kept up communication between Russia and Alaska. The *Vostok* carried 117 souls all told, including an astronomer and an artist; none of the work of the latter, however, illustrates this work, but it appears in the atlas accompanying the original narrative. The *Mirni* had a complement of seventy-two; no chaplain is mentioned in the list of officers of either ship, but there was a priest on board the *Mirni*, who visited the *Vostok* when weather permitted, and on the two vessels parting company for a time he was transferred to the bigger ship, where he could minister to the larger congregation. Two German naturalists were engaged to join the expedition at Copenhagen, but they evidently got frightened, and refused to join, sending very transparent excuses instead, and Bellingshausen tried desperately to fill their places, but in vain. On July 29 the ships anchored in Spithead, and Bellingshausen took coach to London to buy charts, books, and instruments. He was introduced to Sir Joseph Banks, the former shipmate of Captain Cook, and then President of the Royal Society, and through him tried to find two English naturalists to take the place of the defaulting Germans, but

a week's labour was given to the search in vain. The expedition waited in the hope of finding naturalists until August 25, and then had to sail without them, to the deep regret of the captain, who keenly realized the magnitude of the opportunities which would be open to him, and of which he would be powerless to take advantage. From a passage in the translation, one might suppose that a Russian naturalist may possibly have been found after all, for we are told that in lodging "the astronomer Simanoff and the naturalist Michaeloff" in rooms opposite to those of the two captains while the ships lay in Sydney harbour, the Mayor of Paramatta jocularly observed that science and navigation should never be separated. On referring to the original, however, we find that Michaeloff is called "painter from nature," and not "naturalist."

The ships touched at Tenerife and at Rio de Janeiro, where they met the Russian arctic squadron bound for Bering strait. A snowstorm was encountered on December 15, in 53° S., and next day South Georgia was sighted. The ships sailed slowly along the south coast, meeting a boat from two British seal-ships, which lay in one of the harbours, and discovering a small off-lying island, which was named after Annenkoff, one of the lieutenants of the *Mirni*. A running survey was made of the south coast of South Georgia, which was sprinkled plentifully with Russian names. The weather was foggy, with constant showers of rain and snow, and on the 17th the ships left the coast, steering for the South Sandwich islands. Halfway across a sounding was taken in 260 fathoms with no bottom, and a temperature observation of 31°·75 Fahr. at 270 fathoms is recorded. In 56° S. the first ice-island was seen rising 180 feet above the sea, and covered with penguins, to the great amazement of the Russian crews. Innumerable whales were in sight, and albatrosses accompanied the ships. On December 23 a group of three small islands lying to the north of the Sandwich group was discovered, and named collectively after Baron Traversey, the Minister of Marine, who had equipped the expedition. One of the islands, named after Savodoffski, the first lieutenant of the *Vostok*, culminated in a remarkable summit, shaped like two SS leaning against each other, a puzzling description to which the translator not unnaturally affixes a query. The crater on this island emitted a thick cloud of vapour, and when landed upon the mountain-side halfway up was found hot to the touch; the warmth and freedom from snow made it the site of a great penguin rookery. An experiment was made in the use of melted ice hewn from the floating masses for making tea, and the result proved highly satisfactory, so that henceforth the ice furnished the expedition's water-supply.

Observations were made at this point with a special deep-sea thermometer enclosed in a sheet-iron cylinder provided with valves, through which the water passed freely as it descended, but was

retained on the ascent. At 220 fathoms a temperature of −1° R. was obtained by this instrument, the surface temperature being +0°·5 R.; but Bellingshausen had not perfect confidence in the contained water retaining its temperature unchanged. He proved, however, that the water at 220 fathoms was distinctly salter than that at the surface.

The Candlemas islands, Saunders island, and Montague island, discovered by Cook, were passed on their eastern side, and recognized; the two latter had a fine appearance, seen as they were with the sunshine glittering on their covering of snow. The weather speedily relapsed into its normal state of fog and snow-squalls, and for several days the ships tried to make their way southward through an increasing number of bergs. On January 1, 1820, a glimpse of Bristol island was obtained through the fog, but the weather continued so bad that it was impossible for the officers of the *Mirni* to come on board the *Vostok* for a New Year's feast. Next day the land of Southern Thule was sighted, and found to be a group consisting of one large and three smaller islands, all very high and inaccessible. Bellingshausen named the largest member of the group Cook island, in honour of its discoverer. On January 3 the parallel of 60° S. was crossed for the first time, but next day it was necessary to shape a northerly course, as the ice was impenetrable to the south, and the rigging was so encumbered with snow and ice as to make it almost impossible to manœuvre the ships. Southern Thule and Bristol island were passed on their western side, the group being circumnavigated for the first time, and on the 5th the ships were back in the position occupied four days previously.

A fresh attempt was made to get south, as the weather had improved, and with a strong westerly wind a steady course east by south was steered for many hours, affording a welcome rest to the crews, wearied by the incessant tacking of the previous week. On January 8, however, in 60° S. and 18° W., solid ice appeared once more to the south, and a course was held eastward through drifting bergs. The appearance of marine animals suggested the proximity of land, but no other indications were seen. On the 11th it was possible to steer south-south-east, and a slight but distinct swell coming from the south suggested the idea that the sea towards the pole was more open and free from ice than where they were. The Russian ships were now well to the south of Cook's homeward track, and in a stretch of ocean where no other vessel had ever sailed. On January 11, about 12° W., a fresh south-westerly breeze made it possible to set a course south-east through a clear sea, and as the wind veered to north the course was gradually altered to south, until, on January 15, the antarctic circle was crossed for the first time in 3° W. long., and next day the latitude of 69° 21′ S. was reached on the same meridian. It is interesting to notice that when Biscoe passed along the same track eleven years later in the same month, he coasted

the ice-pack on a track almost coinciding with Bellingshausen's. For three days the *Vostok* and *Mirni* tried to work round the projecting promontory of ice which barred the way to the south and east, and on January 19 the way to the south seemed clear; though the ships were smothered in snow and the air-temperature was below 30° Fahr., there was little ice, and whales were blowing all round. On the 21st, however, a vast icefield appeared in the south, and the ships had to turn from a position in 69° 25′ S., 1° 11′ W. to the north-east once more, the circle being crossed northwards on the 23rd. Every moonlight night, when the stars were visible, was taken advantage of for lunar observations on both ships, the resulting longitudes being apparently of very fair accuracy. The eastward route had kept about 5° to the south of Cook's outward track on his vain hunt for Bouvet island, and at last, on February 3, it was possible once more to pass the circle southwards in 18° E., and on the 6th the latitude of 69° 6′ S. was reached in 16° E. Here a sounding showed no bottom at 180 fathoms, the air-temperature was −4° R. (23° Fahr.), and the sea was full of pack-ice, increasing in density towards the south. Whales were playing in the lanes of open water. While the great drifting ice-islands were obviously derived from the land, Bellingshausen satisfied himself that the pack-ice was produced at sea, for with a temperature of 23° Fahr. a month after midsummer, it was evident that the cold in winter must be very severe, while the immense snowfall of those latitudes and the condensation from the atmosphere on the cold ice must at all times of the year tend to increase the volume of the floating masses. Once more it was necessary to turn back, and the circle was crossed northwards on February 8 in 21° E. The weather continued wretched—gales, snow, and a temperature always below the freezing-point.

The last attempt to get southwards led to the crossing of the circle on February 14 in 38° E., the point where Cook had made his first attempt to enter the real antarctic. The declination of the compass was found to have increased nearly 11° westerly since Cook's time. On the 15th the worst storm of the voyage descended on the ships; decks and rigging were covered thick with snow, a terrific sea washed over the vessels, and the greatest anxiety was felt as to the result. For three days the gale lasted, the wind blowing from north and north-north-east, while the snow-showers hid the drifting bergs until the ships were almost upon them, and every rope and spar had a crust of ice 1½ inch thick. The only chance of safety was to beat to the northward in the hope of clearing the ice, and in the end both ships emerged still in company and both undamaged.

On February 20 the ships were in 63° S., 42° E., and they held a due easterly course to 68° E., in order to look for any land in those latitudes that might have been missed by Cook when he made his great *détour* to the north in search of Marion island. Nothing was seen except

occasional floating ice, and, gradually working further north, they crossed the parallel of 60° S. on March 5, in 87° E., close to the point where Cook had crossed it southwards on the return from his northward trip. A few days previously the hundredth day of the voyage from Rio de Janeiro had been celebrated with great satisfaction, for the health of all on board both ships was excellent; but supplies were running low, and it was becoming necessary to revisit some port where they could be replenished. On March 4 an enormous iceberg was in sight, the height of which, as measured by sextant observations from the *Vostok*, was 375 feet, and from the *Mirni* 408 feet.

Bellingshausen now resolved to part company with the *Mirni*, in order to more thoroughly explore the sea south of Australia. He accordingly arranged for a rendezvous at Royal Company island, marked on Arrowsmith's map in 49° 30′ S., 143° 4′ E., towards which point the two ships should proceed on parallel courses 8° apart, the *Vostok* following the more northerly and more direct track. The *Vostok*, having taken the priest on board, and being no longer obliged to shorten sail for her slower consort, made a quick voyage to the reported position of Royal Company island, which was reached on March 22, but neither island nor *Mirni* was to be found. Two days later the coast of Van Dieman's Land came in sight, and on the 29th the *Vostok* anchored in Sydney harbour, after a voyage of 131 days. The *Mirni* had not arrived; but the arctic expedition in the *Otkritie* and *Blagonamerenni*, which sailed on the same day from Kronstadt and were left in Rio, were again encountered on their leisurely voyage to Bering strait.

At Sydney the Russians received a most hearty welcome, and Bellingshausen speaks with great cordiality of the generous kindness shown by the governor, General Macquarie. On April 7, when being shown the new lighthouse on the South Head, the Russian officers had the pleasure of seeing the *Mirni* enter the harbour, all well with the exception of one sailor, who showed some symptoms of scurvy.

The two ships lay in Sydney harbour for a month, making various repairs and taking in fresh stores, and then sailed for a long cruise in the tropical Pacific, exploring the island groups, especially the Paumotus, then scarcely known, discovering several new islands, and penetrating as far as Cook's great place of refreshment, Tahiti, where King Pomare, an independent monarch under British influence, received them with graceful hospitality. They were back in Sydney on September 8 after four months' absence, and here Bellingshausen learned from the Russian consul of the discovery of the South Shetlands by William Smith in 1819, a fact of some little moment as bearing on the credibility of the American sealer Fanning, who states that Bellingshausen believed he had made a discovery when he sighted the New Shetlands, until Captain Palmer told him what they were.

On October 31, 1820, the *Vostok* and *Mirni* left Sydney harbour for their second visit to the antarctic regions. On November 17 they were off the Macquarie islands, and experienced an earthquake shock while in more than 50 fathoms of water. On the 27th they crossed the parallel of 60° S. in 163° E., and the officers drank the health of their friends in St. Petersburg in 60° N. Next day the first iceberg was seen, a stately mass with fretted sides that looked as if they were ornamented with statues. Loose floating ice then appeared, and behind it a solid wall of ice, along which they cruised south-eastward. Some ice-islands, one nearly 5 miles in circumference, appeared beyond, and at first this was mistaken for land. The sea seemed most open to the east, and so Bellingshausen kept eastward along the edge of the solid ice, until on November 30 he almost touched 65° S. in 169° E. Then the fine weather ceased, the margin of the ice turned to a north-easterly trend, and the ships worked their way with care and difficulty through the loose pack and icebergs, of which more than a hundred were in sight at one time. The ships, Bellingshausen says, were far too weak to risk any severe pressure in the ice, a hint which shows that he had at least some wish to attempt to penetrate the pack, though he could have no idea of the great expanse of open sea along the coast of the undiscovered Victoria-land which it sealed up. For four days he had skirted the margin of the impenetrable ice, for a distance of 380 miles, and just when the end of it seemed to be reached a frightful storm came on. To add to the misery of the gale and the darkness, the wild rolling of the ship shook masses of snow and ice from the rigging, which fell on the deck and made it dangerous to move about. The birds brought from the tropics as pets were dying daily in the severe climate, but the polar birds native to the region appeared in increasing numbers, always suggesting the proximity of land.

At last, on December 13, the polar circle was reached again in 164° 34′ W., and the midnight sun was seen; but next day the ships were almost beset in a field of loose floating blocks of ice not more than 5 to 7 feet thick, and recalling the familiar ice-floes of the Baltic. It was necessary, however, to retreat northwards, but the belief that behind this floating ice solid land existed seems to have been strong in the minds of the officers. The weather was a succession of gales and fogs, the edge of the ice turned the ships further and further north as they proceeded eastward, and just in the longitudes where Cook sailed for 13° within the antarctic circle Bellingshausen was forced to within a mile or two of the sixtieth parallel in order to get round the ice, yet he was a fortnight later in the season than Cook. It was observed that a bank of fog formed over the large bergs, so that they could be recognized by the cloud that capped them even when they themselves were below the horizon. On Christmas Day (Russian calendar) 244 icebergs were in sight, and the commander congratulated himself that both

crews were in excellent health, better than they had enjoyed in the tropics.

On the meridian of 135° W., where Cook had run north to refresh his exhausted crew, Bellingshausen was able to turn southwards, and on December 30 he crossed the circle, only to be turned back in 67° 30′ S., 120° W., by solid ice. Another northward bend brought the ships to the longitude where Cook had made his farthest south, but, as Bellingshausen considered it unnecessary to follow the track of his predecessor, he changed his course to south-east, crossed Cook's route, and crossed the circle for the sixth time on January 7, in 104° W. A south-easterly course led through a crowd of ice-islands, one of them about 20 miles in circumference and rising 200 feet above the water. On January 10 the farthest south point of the voyage was reached in 69° 53′ S., and 92° 19′ W. At 3 p.m. a dark speck appeared on the white background of ice to the east. All the telescopes in the ship were turned upon it, and various opinions were being expressed, when the sun shone out and revealed it as land without a doubt, the steep cliffs and rocks standing out black and free from snow. The land had appeared suddenly without a warning sign. It was the most southerly known land in the world, the first to be discovered within the antarctic circle. Next day a nearer view was obtained. The land proved to be an island, 9½ miles long and 4 miles broad, lying in 68° 57′ S., 90° 46′ W., and rising to a height variously estimated at from 3961 feet to 4390 feet. It was named after Peter the Great, founder of the Russian navy. It appeared unlikely that such an island existed entirely alone, and a keen look-out soon revealed more land that seemed like a continuation of the island and then vanished in the fog. At this point in the narrative Bellingshausen brings in a long digression describing experiments made a year before on the freezing of sea-water and fresh water, with a couple of pages of speculation as to the formation of sea-ice, and a renewed declaration that the icebergs were not sea-ice, but produced from some great southern land just as the small masses of ice had been seen to detach themselves from the slopes of Peter I. island. On the 15th, still south of 69° S., with an impenetrable pack to the southward, the sea-water was observed to be discoloured, but a sounding gave no bottom at 145 fathoms. Then sea-swallows appeared, a certain sign of land according to Bellingshausen, who wrote, "the land *must* come," and on the 17th it came. It was beautiful weather, the finest day of the whole voyage before or after, and a great peak rose 40 miles to the east-south-east, approximately in 68° 43′ S., 73° 10′ W., beyond a broad stretch of impenetrable ice. It was named after the originator of the expedition, Alexander I. The new discovery was called a land, not an island, for distant snow-free peaks appeared beyond that which was first seen, and its extent seemed to be considerable.

A course was now set for the South Shetlands, with the object of

approaching them from the south and ascertaining definitely whether they had any connection with the conjectural antarctic continent. On January 24 land was seen and identified as the South Shetlands. A number of small islands were named after various victories of the Russians over the French in Napoleon's campaigns. At Little Yaroslav island Bellingshausen found on the morning of January 25 eight British and American sealers lying at anchor, and, having invited Captain Palmer on board the *Vostok*, he obtained from him some particulars as to the work of the hunters. It is somewhat remarkable to find no mention made of the mainland south of the South Shetlands, to which Fanning explicitly states that Bellingshausen gave the name of Palmer land, and to find no mention of the services of Palmer as pilot, to which Fanning devotes some space. No stay appears to have been made, and the north-eastward course was resumed, a few more small islands being sighted and named on the way; the 60th parallel was passed on January 31, and after a time of severe but needless anxiety on account of the Shag rocks, which were passed in a fog, Rio was reached on February 26 and left on April 23. At last, on June 24, 1821, the two ships dropped anchor once more at Kronstadt, after an absence of 751 days, 527 of which had been passed under sail, and the whole distance travelled had been 2¼ times the circumference of the Earth.

The voyage had been planned as a continuation of the voyage of Cook, and Bellingshausen seemed to have possessed not a little of the spirit of the great navigator whose labours he most loyally supplemented, even to the extent of foregoing the opportunity of possibly approaching nearer to the pole in order to explore the more open parts of the Southern ocean in the longitudes where Cook had got far south. It is unfortunate that this splendid voyage remained without result; for the course of subsequent explorations would have been the same had it never taken place. A timely translation into English would have facilitated the voyages of Biscoe, Balleny, Wilkes, and Ross.

THE SCIENTIFIC WORK OF THE SWEDISH ANTARCTIC EXPEDITION AT THE FALKLAND ISLANDS AND IN TIERRA DEL FUEGO.

By Dr. J. GUNNAR ANDERSSON.

I. *The Falkland Islands.*—After the return of the *Antarctic*, on July 4, to Port Stanley from South Georgia (see *Geo. Journal*, vol. xx. p. 405), the members of the expedition on board this ship carried on investigations in different parts of the Falkland islands until September 11. The botanist made valuable collections of marine algæ, and to some extent also of land-plants, though the season was very unfavourable

for investigations of this kind. In the shallow bays and harbours of the Falkland islands seventeen trawlings were made, some of which have shown a rich animal life. Also of the lower land and fresh-water fauna (insects, crustaceans, molluscs) a considerable collection has been brought together.

In connection with the geological survey, collections of marine fossils have been made both in East and West Falkland, in the Devonian sandstone, first studied by Darwin, forming the prevailing formation of the islands. Scattered and badly preserved plants have also been found, partly together with the marine fossils. The hitherto unknown base of the Devonian formation has been discovered in Cape Meredith, West Falkland, where the sandstone rests on a highly disintegrated formation of gneiss and granite.

Special attention has been devoted to these grand phenomena so characteristic of the Falkland islands, which have been described as "stone-rivers." A detailed survey of one of the largest stone-rivers has proved that we have here on a large scale a peculiar mode of detritus-transport, previously described by the author from the arctic region (Bear island). The formation of the stone-rivers belongs to a past period, and it seems very probable that it ought to be regarded as a subglacial facies of the ice-age. In that time, when Tierra del Fuego, South Georgia, and the Dirk-Gerritsz archipelago were under their maximum glaciation, there probably existed in the Falkland islands a climate not favourable to the formation of glaciers, but in winter-time permitting the deposition of a thick snow-cover, which, when melting in summer-time, caused a slow but extended movement of the detritus downhill.

We have found in the Falkland islands evidence both of a submergence and of a greater elevation than exists at present. Small river-valleys, the lower part of which is now submerged under the surface of the sea, forming numerous creeks all round the coasts of the main islands, indicate that this archipelago before the ice-age (in the time of the stone-river formation) was elevated at least 30 to 50 feet above its present position, while on the other side raised beaches (terraces and shingle-covered plains) prove that these islands in a post-glacial period have been submerged at least 210 feet below the present sea-level.

II. *Trawlings on the Banks between the Falkland Islands and Tierra del Fuego.*—On the passage between the Falkland islands and Tierra del Fuego, September 11–15, five trawlings were made on the coast banks and the Burdwood bank, the fauna of which was hitherto very little known (south of West Falkland, 100 fathoms; the Burdwood bank, 80 fathoms; three trawlings; eastern entrance of Beagle channel, 50 fathoms). These trawlings yielded an extraordinary rich result, in which were to be observed hydroids with large luxurious colonies,

belonging to several species; corals, ophiurids, asteroids, etc., with the most beautiful forms and colours. The most valuable find, according to the report of the zoologist, Mr. K. A. Andersson, are some colonies of that very remarkable *lephalodiscus*, discovered in 1876 by the Challenger Expedition in the Strait of Magellan, but never found afterwards. Once before *lephalodiscus* had been found by our expedition, viz. on January 16, 1902, at Cape Seymour (lat. 64° 21′ S., long. 56° 46′ W.), at a depth of 80 fathoms.

III. *Tierra del Fuego.*—Here our expedition has been working, first in the month of March, 1902, before the departure for South Georgia, then since September 15, the investigations being not yet concluded. If an excursion to Lago Fagnano, in the interior of Tierra del Fuego, is left out of consideration, all our operations have been limited to the Beagle channel. There may be mentioned a visit to the small isolated occurrence of the Tertiary formation in Slogget bay (eastern entrance of the Beagle channel). The Tertiary beds here rest upon disintegrated rocks belonging to the Cordillera series. The deposits of the ice-age, hitherto unknown from the south-eastern part of Tierra del Fuego, have been observed in Slogget bay, at the eastern end of Lago Fagnano, in a river-valley at the north side of the Cordillera and in the neighbourhood of Harberton harbour. In all these places there occur, in connection with the moraine stratified sediments, coarse gravel and sand of considerable thickness, and evidently of fluvio-glacial origin.

Very instructive was the splendid section in the 120-feet-high *fairauca* on the west side of Gable island in Beagle channel. The lower part of the section consists of stratified sediments, coarse gravel with intercalations of beds of sand, the whole presenting fine discordances. On these stratified sediments, the largest visible thickness of which was found to be 75 feet, there rests a mass of typical moraine clay, without any sign of stratification. The largest thickness of the moraine observed was 45 feet. In this moraine clay were found some fragments of fossils (mussels and balanids). This find indicates that the ice-stream which once filled up Beagle channel has mixed in with its moraine *débris* of Tertiary or Quarternary (pre- or interglacial) marine beds, that is, sediments which are not yet known from this region.

The botanical investigations have yielded considerable collections of marine algæ. As regards the land flora, the higher mountain regions especially have given a good result. Zoological trawlings have been made in the Beagle channel in fifteen localities, and in depths from 120 fathoms to the littoral zone. Two of the largest lakes of Tierra del Fuego, Lago Rosa (Arigami) at Lapataia bay, and Lago Fagnano in the interior, have been made the objects of zoological investigations. Two of the members of the expedition, Messrs. K. A. Andersson and Skottsberg, visited Lago Rosa on October 8 to 13, made collections of the fauna and vegetation of the lake, and sounded very considerable depths down

to 45 fathoms. The excursion to Lago Fagnano started from Harberton on the Beagle channel, and went through a pass in the Cordillera. In this region three young pioneers, Messrs. Bridges, sons of the well-known English missionary, have, with a subvention from the Argentine Government, cut a horse-track through the forests. In this road I brought with the assistance of Ona Indians, a canvas boat to Lago Fagnano, and made from it zoological collections in the eastern part of the lake.

Since the *Antarctic* has in Ushuaia been completely fitted out, we leave for the south early in November. At first we intend to make cartographical, geological, and biological investigations at the South Shetland islands and in Orleans inlet. About December 10 we expect to arrive at the winter station of the expedition on Snow hill. The second part of the summer voyage will be arranged by the leader of the expedition, Dr. Nordenskjöld.

Our expedition has received most valuable support from the Argentine Government. Twice we have received in Ushuaia free of expense a supply of coal, and now, moreover, a considerable quantity of reserve provisions. This generosity has made us deeply indebted to a nation which has also directly taken part in the great antarctic scientific co-operation by erecting a station on Staaten island, and by sending an officer of its navy to winter with Dr. Nordenskjöld.

Harberton, Tierra del Fuego, October 31, 1902.

MAJOR DELMÉ RADCLIFFE'S MAP OF THE NILE PROVINCE OF THE UGANDA PROTECTORATE.*

Note by Sir HARRY JOHNSTON, G.C.M.G., K.C.B.

THAT portion of the Uganda Protectorate which is styled the Nile Province has never, until quite recently, received anything like a systematic survey. None of the work done under Sir Samuel Baker, Gordon Pasha, or Emin Pasha was of an accurate nature. The late Colonel Vandeleur laid the foundations of something approaching systematic geography in Uganda and Unyoro, but the Nile Province in 1895 was far too unsettled and distant for Colonel Vandeleur to extend his work in that direction. The expedition under Colonel J. R. L. Macdonald, which did so much to increase our knowledge of this protectorate, confined its work to the regions east of the Nile Province, so that when the writer of these lines came on the scene as Special Commissioner in 1899 he found the greatest difficulty in shaping any military or civil policy north of the Victoria Nile, or determining what steps should be taken to finally extinguish the mutiny of the Sudanese

* Map, p. 220.

soldiers (who had retreated north from Foweira), because no positive information existed regarding the geography of the country—the existence and course of its rivers, or the height and disposition of its mountains. He therefore asked Major C. Delmé Radcliffe, who had recently been made both senior military officer and civil administrator of the Nile Province, to commence a systematic survey with such instruments as were available. The work done by Major Delmé Radcliffe is shown by the accompanying map. It is a valuable addition to our knowledge of the definite geography of the Uganda Protectorate. For the first time the middle course of the river Acha (Asua) is laid down. The river Kokolle, which enters the Victoria Nile a little distance above Foweira, is also mapped. A great deal of accurate information has been added to our knowledge of the rivers Ayuge and Unyame, which enter the Nile in nearly parallel courses at the commencement of the Dufile rapids. For the first time also in the history of Nile discovery, the White Nile is accurately figured from its exit from Lake Albert to Dufile, and it is important to observe what Major Radcliffe brings out so well on his map—how lacustrine is this section of the river. In the history of Nile exploration it is interesting to remark how long this piece of the Nile has remained unmapped—namely, from Dufile on the north to Lake Albert on the south. All the earlier explorers generally quitted the Nile at Gondokoro, or somewhere between Gondokoro and Dufile, and struck right across country through the lands of the Madi Acholi and Lango till they reached the Victoria Nile. Subsequently the navigable nature of the Nile between Dufile and Lake Albert was realized, but apparently no one took the trouble to map it with any approach to accuracy.

Major Delmé Radcliffe founded the Government station of Nimule, which is now the military headquarters of the Nile Province. He has also done a great deal to transcribe accurately the correct native names of places, mountains, and rivers. He has been obliged to retain in some cases the old incorrect form which use and custom have sanctioned. In most of these instances this incorrectness is due to the Arab pronunciation, which has turned all the *p*'s into *f*'s. A very curious feature about the northern Bantu languages in the Uganda Protectorate is their strong dislike to the consonant *p*, which, indeed, scarcely exists in indigenous words. On the other hand, the Nilotic languages which border on the Bantu have no objection to this consonant. It would seem, however, as though the Bantu dislike to the *p* is a recent feature, and that we may trace in parts of the Nile Province which Major Delmé Radcliffe has surveyed traces of old Bantu place and tribal names long since overlaid by Nilotic forms of speech. Among these place-names the locative *pa-* prefix of the original Bantu tongue is frequently met with. Major Delmé Radcliffe has pointed out to the writer of these few lines that the proper pronunciation of Foweira is

Pawera; of Fajao, Pajao; of Fatiko, Patiko; and so forth. No doubt the Bantu speech crossed this Nile Province at some remote period, and left behind it the locative *pa-* prefix in connection with many place-names.

BARTHOLOMEW'S SURVEY ATLAS OF ENGLAND AND WALES.*

THE Ordnance Survey maps, owing to their great accuracy, amount of detailed information, and general excellence, must naturally form the basis of any work dealing with the topographical features of the British Isles; but the large number of sheets required to represent any considerable area render them to a great extent inaccessible for general reference to many persons, and unsuited for the study of any extensive district as a whole. It is therefore most important that carefully executed reductions should be published, and this work for some years past Mr. J. G. Bartholomew has been engaged upon, with most satisfactory results, his maps on the scale of 2 miles to an inch having deservedly obtained a very high reputation.

The publication of his admirable atlas of Scotland seven years ago gave rise to a very general desire for one of a similar character of England and Wales, and it was arranged that such a work should be taken in hand as soon as possible. Being assured of the advisability of such an undertaking, after consultation with Mr. Bartholomew and inspecting specimens of his cartographical productions, the Council of this Society consented to allow the atlas to be published under its auspices, and judging from the excellency of the maps contained in this first part, which has just appeared, there is every reason to believe that the work will be quite equal to expectations, and that the confidence of the Society will be fully justified.

As in the case of the atlas of Scotland, the greater part of the present work consists of a series of sheets, numbering sixty-seven altogether, reduced by permission from the new Ordnance Survey maps to the scale of 2 miles to an inch. In addition to showing towns, villages, roads, railways, and other information of a general character, which has been judiciously selected, the special feature of the sheets is the admirable manner in which the relief of the land is indicated by a combination of contour lines and tinting. Those already acquainted with Mr. Bartholomew's reduced Ordnance Survey maps, and have had

* The Survey Atlas of England and Wales. A Series of Eighty-four Plates of Maps and Plans, with Descriptive Text, illustrating the Topography, Physiography, Geology, Climate, and the Political and Commercial Features of the Country. Designed by and prepared under the direction of J. G. Bartholomew, F.R.S.E., F.R.G.S. John Bartholomew & Co., The Geographical Institute, Edinburgh. Under the patronage of the Royal Geographical Society. 1903.

occasion to use them practically, will be in a position to judge of their remarkable clearness, the care taken in the selection of the tints, their accurate registration, and general merits; and to state that the sheets in the present atlas are up to the standard of those previously published is in itself sufficient recommendation. The number of the contours and tints employed upon each sheet must, of course, depend upon the topography of the district represented, but upon those contained in the present part there are from sixteen to eighteen, ranging from sea-level to altitudes exceeding 3500 feet. The low-lying lands from sea-level to 400 feet are shown in four tints of green, and after that shades of burnt sienna are employed, with a general effect that is on the whole most satisfactory. A great deal can be learnt from a careful study of these maps, not merely concerning the physical features of the country itself, but in connection with the influence of these upon the location of towns, and the distribution and industrial and commercial development of the population. Preceding these large-scale detailed sheets, the atlas will contain eleven maps of a general and physical character, exhibiting the bathy-orographical features of England and Wales, the geology, the distribution of vegetation and agriculture, meteorology, railways, density of population, parliamentary and ecclesiastical divisions, as well as others devoted to the commerce and industry of the country. Many of these will be extremely interesting and especially important, inasmuch as they have been prepared from the latest available sources of information, whilst the fact that those dealing with the orography, geology, and meteorology, together with the text accompanying them, have been revised by Sir Archibald Geikie, Dr. Alexander Buchan, and other specialists, is sufficient guarantee of their trustworthy nature. The population, agricultural, industrial, and other statistical maps and text have been compiled from the census of 1901. The last six sheets in the atlas will consist of the following plans: No. 79, London; 80, County of London; 81, Liverpool and Manchester; 82, Newcastle, Hull, Bradford, and Leeds; 83, Sheffield, Nottingham, Birmingham, and Leicester; 84, Bristol, Portsmouth, Plymouth, and Brighton; and in order to ensure accuracy, each of these has been submitted to local surveyors and others for careful revision. After these plans will follow descriptive and statistical text.

It is the intention of the publishers to issue the whole work in twenty-one monthly parts, at 2*s.* 6*d.* each, or £2 12*s.* 6*d.* for the complete atlas. The first part, which has just appeared, contains the title, preface, list of plates, after which follow three sections of the 2-miles-to-an-inch map, containing VI. Carlisle and Keswick, VII. Barrow and Windermere, XV. Anglesey and Conway, and a plan of the County of London, showing boroughs.

There can be no doubt that this atlas will meet a long-felt want, and be greatly appreciated by many.

THE VOLCANIC ERUPTIONS AND EARTHQUAKES.

During the last two months a large amount of additional information has been received both with regard to volcanic and seismic occurrences already reported, and to more recent disturbances. Continuing its investigations in Martinique, the commission headed by M. Lacroix reports that a new cone, higher than the former summit of the mountain, had formed in the crater of Mont Pelée, and that in consequence of the undermining and shattering of this cone, quantities of hot volcanic material had filled the upper valley of the Rivière Blanche, entirely blocking it. Despatches from the governor of the Windward islands stated that the eruption of the St. Vincent Soufrière on October 15 and 16 had increased the area of devastation. No part of the island was really safe, and the question of abandoning it altogether had to be seriously considered.

According to Mr. J. P. Quinton, who ascended the Soufrière with a party on October 28, the chief activity was in the old crater, which was discharging stones and ashes, with volumes of steam, but no lava; the crater had increased in width and become more funnel-shaped, and the steam was issuing from a fissure in its southern wall. Both Mont Pelée and La Soufrière were in violent eruption on November 26. Mont Pelée was again active during the first week in December. A fresh eruption of La Soufrière occurred on December 18, and on December 27 Mont Pelée once more broke out, ejecting dense volumes of smoke and quantities of dust.

Further details about the Kashgar earthquake of August 22, published in the *Standard*, quoting from the *Turkestan Gazette*, state that the town of Nijni-Artish was destroyed, engulfed in immense fissures, and 1700 lives were lost. Six hundred persons were killed at Kashgar, and the village of Besh-Kerim, with its entire population of about six hundred, was annihilated.

That the eruptions in Guatemala were on an enormous scale appears from information published by a correspondent in the *Times*. We quote from *Nature* of December 11: "On October 24, at about 5 p.m., a violent eruption took place in the ravine which divides the volcano of Santa Maria from that of the Siete Orejas. At 5 a.m. on October 25 subdued noises were heard, emanating apparently from the direction of Quezaltenango. Later on the detonations grew louder. At 6 p.m. the eruption reached its climax. For about an hour the detonations had ceased, when, by a terrific outburst, the whole of the capital was thrown into a panic, and everybody rushed out into the streets. This cannonade lasted for ten minutes, during which time the strongest-built houses shook violently. At intervals the detonations continued through the night, and in a less degree afterwards. The explosions were heard in the south of Nicaragua, and a telegram was received from San Salvador, stating that the inhabitants had rushed into the streets in terror on hearing the noise. Quezaltenango was thirty-six hours in total darkness, during which time a heavy rain of ashes and sand had been falling. The manager of the Saleinas estate, which lies just above the scene of the eruption, says that at about 5 o'clock on October 24 they were alarmed by a series of earthquakes of a throbbing nature, which appeared to come from below them. Almost simultaneously a cloud of steam was seen to issue from the ravine already mentioned, about a league away. Soon after, ashes and sand, accompanied by small stones, commenced falling, and two hours later the odour of sulphur and gases was so great that he could hold out no longer, and he left on foot for Retalhuleu, a distance of some 30 miles. Reports from the other planters confirm the fear that the whole of the Costa Cuca, probably the richest coffee zone in the country, is totally ruined."

Amongst the more recent occurrences are the following. During November it

was reported from Hawaii that the volcano of Kilauea was more active than it had been for twenty years. The volcano on the island of Savaii, Samoa, was stated to be in violent eruption. Explosive eruptions, with ejection of stones and dust, as well as flow of lava, occurred at Stromboli about November 16. Strong earthquakes were felt in Algeria on November 17 and 20.

On December 16, at 9.30 a.m., the town of Andijan, in the province of Ferghana, Russian Central Asia, was entirely destroyed by an earthquake. It is estimated that at that time nearly 16,000 houses were destroyed and 5000 persons killed. On December 23 it was reported that the shocks continued with increasing violence, the disturbed area extending over about 90 square miles. A specially violent shock was felt at 10 p.m. on December 27. A later report on December 28 stated that the earthquake of December 16 affected about 650 square miles; the epicentrum, about 4 miles to the south of Andijan, was indicated by a rent in the earth, from which sand, water, and mud were being thrown up. The statical wave was about 28 inches high, and took a northerly direction. The area of greatest destruction formed a sector, with a radius of about 17 miles, to the south of the town.*

On December 28, at 8 p.m., a severe shock of earthquake was experienced at Syracuse.

The fact that the earthquakes at Schemakha, Kashgar, and Andijan have occurred along a theoretical line of weakness in the Earth's crust lends additional interest to their correlation. It is conjectured that this line sweeps along the Caucasus and crosses the Caspian in an arc, which, instead of continuing its course, is disturbed by a sigmoid flexure, so that a long flattened occurs with its head near the node of mountains between Kashgar and Andijan, and its tail continued in a long circular sweep up through the Caucasus. This node exists also at the point where the arc would, if undisturbed by the flexure, intersect another arc which sweeps downwards towards the Himalayas round the Tarim basin and Tibet.

The depression south of the Caucasus, on the edge of which the earthquakes occurred which ruined Schemakha, may be compared with the triangular depression of north Ferghana, where Andijan was destroyed; and Kashgar again stands at the edge of the Tarim basin, so that all three places stand on the foothills of folded mountains that border three depressions.

Nature of January 8 reports that "a few days previous to the dreadful event in Andijan a series of slight earthquake shocks was felt at Schemakha, the site of the disaster in February last." So that it appears more and more evident that during the past year we have passed through a period of adjustment in the Earth's crust with world-wide, earth-shaking results, and these adjustments, as in South Australia at the western border of the Flinders range above the depression of the central plain, are at the edges of folds where previous faulting indicates local weaknesses, and that these cracks have long radial extensions such as are seen upon the surface of the moon. The severity of the results of these adjustments along the Schemakha-Andijan line points to a long-continued strain which, once relieved at a point, spread onwards (like a crack in very cold ice that rings across a pond), and

* We are informed by Prof. Milne that the Andijan earthquake of the 16th, as recorded at Shide, Isle of Wight, was not very large, but as it had to travel 50° (5550 kilomètres) to get there, it was undoubtedly severe at its origin. It was of the world-shaking type; the preliminary tremors which passed through the world reached Shide at $5^h\ 25{\cdot}6^m$ a.m., and as they took ten minutes to travel they started at $5^h\ 15{\cdot}6^m$ G.M.T. If Andijan is $4^h\ 49{\cdot}9^m$ to the east, the local time would be $10^h\ 5{\cdot}5^m$. About fifty minutes later there was a second but smaller disturbance.

produced similar fissures, with eruptions of stones and mud, and at Schemakha, where the crack began, a totally new and unexpected extension of lava, where igneous rock was previously unknown.

CAPTAIN FERRANDI'S JOURNEY FROM LUGH TO BRAVA, SOMALILAND.

Captain Ugo Ferrandi was Italian resident at Lugh, on the Ganana (Jub) river, from 1895 till 1897, when he returned to the coast at Brava, accompanied by Dr. Atkinson of Lord Delamere's expedition. His narrative of this journey has lately been published in pamphlet form, under the auspices of the Società di Esplorazione Commerciale di Milano. Leaving Lugh on April 3, he reached Brava on the 22nd, having covered a distance of 220 miles in 108 hours of actual march. His route in the earlier part of his journey lay chiefly over the same red soil as was traversed during Bòttego's last expedition (see *Journal*, vol. viii. p. 516), on which trees grow freely, while the dark soil produces more herbage. The latter, the *ard mado*, covers the territory known as Baidoa, while the *ard godut* lies to the north, in Molimat and Saraman, and yields much larger and better grain (*dhurra*) than the dark earth. The bush was in some places so thick that a path had to be cut with the axe, while in others the arboreal vegetation was scarce, especially in the Ghel-ghel, a plain passed shortly before reaching the Shebeli, which after rain is covered with a carpet of luxuriant dark green grass. No perennial stream was met with, and sometimes there were no permanent water-holes for long distances (30 or 40 miles); but, as several heavy storms occurred, the caravan never suffered from want of water. The wells of Gondut are probably supplied by infiltration from the hills that bound the valley of the Jub. Supplies were also obtained from pools and from holes in dry watercourses. Of these the most considerable is one that nearly surrounds Matagoi, which, descending from the neighbourhood of Mount Egerta and running south-south-west, probably ends in swamps north of the marshes where the Shebeli loses itself. It was full of water when Ferrandi passed. From Derasalle two routes branch off to Sablalle, one past Hel Giri (the well of the giraffe), where there are funnel-shaped holes in the sand more than 20 feet deep, surrounded by *dum* palms, and the other in a more southerly direction, which Captain Ferrandi chose, because it would give him an opportunity of crossing the Webi Shebeli either at Sablalle or at Kumia. At the latter place the passage of the river is easier at high water, for then the Shebeli at Sablalle sends many branches far into the adjoining lands. However, the latter passage was found to be feasible, and the party crossed by means of a boat kept by a Tuni of Brava without suffering any loss, though most of the caravans passing the river pay toll to the numerous crocodiles that infest it. The water is at least 10 feet deep. Between Sablalle and Brava lies the Webi Gof (dry), a branch of the Shebeli said to have been cut off by the Biemal, who are at feud with the Tuni, but probably the mouth of the channel was closed chiefly by silting up. It would be easy to readmit the water into this bed. Animals of all kinds frequent the wells and pools on the route, and also falcons, crows, guinea-fowl, ibis, and partridges. Several dwarf antelopes (*Madoqua Swaynei*) were shot, and water-buck were seen near the Shebeli. Snakes were extremely plentiful, and of one hundred specimens taken all but about fifteen were poisonous. A gad-fly, called by the natives *bal*, was extremely troublesome in the grass lands; while the *ghindi*, the tsetse of this region, frequents the coppices of dum palms along the river. The bite of the *bal*

is very noxious, and even fatal to animals, and therefore the camels of the Doï, the region two days' journey from the Shebeli into the interior, are driven in the dry season to the Sahel, the coastal zone. The people of the Sahel often purchase camels from the Doï district, for they are fine, strong, and fat. These animals, when they see rain in the interior, frequently make off in that direction, swimming the Shebeli, though usually shy of water, to browse on the young shoots of the acacias and mimosas so abundant in the Doï.

The country towards the Jub is occupied by the Rahanwin, a tribe of mixed origin. The Dabarre, now forming a section of the Rahanwin, and settled between Dechie and Matagoi, claim to be of purer Somali blood, and certainly the coarser type with tufted hair, which among the Rahanwin indicates an intermixture with Swaheli or other imported slaves, is not seen among them. The Jidu, dwelling between Kinnia and Matagoi, claim an Arab descent, pointing out the resemblance in sound between Jidu and Jeddah. Their language certainly differs both from the Somali and Rahanwin. They are a pastoral people, and did not cultivate the soil at all before the murrain in 1888 or 1889, which nearly annihilated their herds. Formerly they were the richest Somali in the country, and now their fine cattle find a ready sale at Brava, and their butter (ghee) is exported to Zanzibar. The Rahanwin and Dabarre cultivate white dhurra principally, and also white Turkish wheat and a little cotton. The last crop is fast disappearing in consequence of the introduction of manufactured cloth from the coast. Dhurra is sown about *neïrus*, the Somali New Year's Day, which always occurs in the middle of August, for the Somali year is ten days longer than that of the Mohammedan calendar (354 or 355 days), and the roots, if left in the ground, produce a second crop. When the roots are grubbed up, a second sowing is made in the *guh*, the season before the south-west monsoon sets in. The ears are cut off and stored in silos, where they keep good for years. Field work is performed by slaves, for Somalis are averse to agricultural labour. Many of the farming settlements are supplied with drinking-water by reservoirs (*nar*), generally constructed by damming up a natural hollow. Artificial irrigation is practised only in the neighbourhood of the Shebeli.

REVIEWS.

EUROPE.

Hydrography of Northern Germany.

'Weser und Ems, ihre Stromgebiete und ihre wichtigsten Nebenflusse.' Im Auftrage des preussischen Wasser-Ausschusses herausgegeben von H. Keller. 5 vols. and Atlas. 1901. Berlin: Dietrich Reimer (Ernst Vohsen).

The series of exhaustive memoirs prepared by the Hydrographical Committee of the Prussian Government has been completed by the publication of that on the Weser and Ems. The other members of this series (Oder, 1896; Elbe, 1898; Memel, Pregel, and Vistula, 1899) have been noticed in the *Journal*, and the new volumes present few novel features. We must, however, remark on the astonishing rapidity with which the enormous labour involved in their compilation has been executed, and congratulate the committee on an achievement of great value to geographical science, as well as to engineering. The arrangement of the present work, as in the others, is regional, each river-basin being treated as a separate unit. Although the area dealt with is small, only 9 per cent. of the German empire lying within the basins of the Weser and Ems, the material for its investigation is more abundant than in the case of the other rivers, and hence it has been possible to go into greater detail. Vol. i. gives a general description of the

region; a hundred pages are devoted to its climate, and ninety to its geology, while a second section deals with the rights and privileges of its inhabitants with regard to the rivers and their waters. Vol. ii. describes the sources and tributary streams (excluding the Aller). Vol. iii. gives full details of the hydrography of the Weser from Münden to Geestemünde, and vol. iv. deals with the Aller and the Ems. Vol. v. consists wholly of statistics. In the atlas, which contains thirty-four sheets, are general maps (orographical, meteorological, and geological) on a scale of 1 : 1,000,000, large-scale maps of the river courses (1 : 50,000 and 1 : 100,000), and longitudinal and transverse sections.

The Vosges.

'Les Hautes-Chaumes des Vosges. Étude de Géographie et d'Économie historiques.' Par Pierre Boyé. Paris: Berger-Levrault & Co. 1903.

The upper portions of the Vosges are, as is well known, occupied by pasturages to which the herdsmen of the neighbouring districts annually take their cattle during the summer months, the time which is not actually spent in tending them being devoted to the making of the cheeses for which the district is famous. Dr. Boyé's volume presents an interesting study of these pasturages from a historical and geographical point of view, his conclusions being based on an exhaustive study of the literature and historical documents relating to the region. At the outset he deals with the derivation of the word *chaume*, which is now rarely met with outside the Vosges, though originally it had a more extended meaning, and does not seem to have been used with reference to this district until the fifteenth century. He rejects the idea that the word has any connection with the *Calvi Montes* of historians, and derives it instead from the Low Latin *calma*, which signified "waste ground." In the country itself the word has been employed with varying significations; while on the German side, other terms, such as *Firsten* and *Wasen*, were employed instead, the former alluding especially to the elevated nature of the pasturages, while the latter is the equivalent of *gazon*, "turf." From the point of view of physical geography, the most interesting section is that which discusses the question whether the higher parts of the Vosges have always been bare, or whether the pasturages have been due to the action of man. Dr. Boyé concludes, on somewhat doubtful grounds, perhaps, that the latter is the case, his chief arguments being the spread of the trees over the upper grounds during times of war, when the pasturages were not used, and the assertion which has been made by experts, that similar mountain pastures can only be developed where wood has once been. In subsequent chapters he traces the history of the pasturages from their first-known mention in A.D. 948, entering into details respecting the long-standing questions of proprietorship, and describing the varying fortunes of the industry connected with them. An interesting chapter also traces the gradual exploration of the "chaumes," in which botanists like Tabernaemontanus and Bauhin took a leading part, and draws attention to the feelings of awe inspired by these upper regions, as by those of most mountain ranges in early days.

ASIA.

Borneo.

'The Home Life of Borneo Head-hunters, its Festivals and Folk-lore.' By W. H. Furness, 3rd M.D. Philadelphia: Lippincott Coy. 1902. 8vo, pp. 197, 88 pls. Price 30*s*.

It is not every traveller who can enter so sympathetically into the life of the people he visits as does Dr. W. H. Furness, who, in his recently published book on 'The Home Life of Borneo Head-hunters, its Festivals and Folk-lore,' has proved

himself a charming writer, an accurate observer, and a skilful photographer. Even to the untravelled reader the book appeals by its manifest sincerity, and the literary skill, combined with a wealth of illustrative plates, enable him to realize the daily life of the interior tribes of Sarawak as does no other book. To one who has travelled over the same ground it recalls many similar experiences, and deserves unqualified praise for accuracy alike of fact and of impression. The book is embellished by 88 beautiful heliotype plates of photographs taken by the author. Too often in books of travels one finds illustrations which do not illustrate anything in particular, or which have so little character that they might be equally appropriate for books dealing with other countries; this is not the case in the present instance, and every plate not only illustrates the text, but it contains details of interest to the ethnologist.

There are several distinct groups of peoples in Borneo. In the jungle are nomadic Punans who never build permanent houses, do not cultivate the soil, and who do not appear to have any well-defined social organization. They wander about in small groups, and of all the tribes of Sarawak they are the most mild and gentle, and they are not head-hunters. Dr. Furness gives a pathetic picture of these simple jungle folk, who, perhaps, may be regarded as the true indigenes of Borneo. They are a straight-haired people, and have the lightest tinted skin of any people in Sarawak. Up to the present there is no satisfactory evidence of the presence of a Negrito race in Borneo.

Mainly along the middle reaches of the rivers are to be found the settlements of numerous agricultural tribes, of weak social organization, who have collectively been termed Kalamantans. It is probable that they have been broken up and to a large extent displaced by a more highly organized group of tribes, who are skilful boatmen and brave warriors. These are the Madangs, Kenyahs, and Kayans, and it is with these last two tribes that this book chiefly deals. Possibly this group of tribes is not indigenous to Borneo.

The lower reaches of the rivers at the western end of Sarawak are largely inhabited by the Iban, who are more commonly known as "Sea Dayaks;" the "Land Dayaks" probably belong to the Kalamantan group. The Iban are a turbulent and pugnacious people, who appear to have formed the pagan advance wave of that movement which culminated in the extension of the Islamized Malays over the archipelago which bears their name.

It is not with such problems as these, nor with the physical characteristics of the peoples of Sarawak, that Dr. Furness deals. He restricts himself to the domestic and social life of the people; and in sympathetic description, enlivened with kindly humour, we have presented before us a faithful record of the daily tasks, the recreations, the social observances, the religious duties, the loves and the hates of a people as yet unspoiled by the white man. All the settled tribes of the interior live in long communal houses built on high piles. They cultivate hill rice, and grow a few tubers and other garden produce; they hunt for animal food in the jungle, and do a little fishing. Their weapons are the blowpipe, the spear, and the parang. The steel blades of the implements are smelted by the Kayans and Kenyahs, who prove themselves to be skilful metal-workers. The war-canoes are dug-outs of enormous size, and decorated with an elaborately carved grotesque animal figure-head. A considerable portion of the book is devoted to an account of a war expedition and of the subsequent peace-making, and the description gives a good idea of the methods of native warfare, and at the same time affords an admirable example of the method of government of the Rajah of Sarawak, to whose wise and beneficent rule Dr. Furness adds his mead of praise, as indeed must all those who have the welfare of the native at heart.

Although the natives recognize several gods, they do not pay much attention to them personally, but they constantly take heed of the omen birds and animals the gods send as messengers to warn or encourage mortals. Scarcely anything that is of the least importance can be attempted until favourable omens have been obtained, and how this is accomplished is duly set forth in the book.

Like many "nature-folk," the natives of Borneo are a very artistic people, and various illustrations are given of their skill in wood-carving; but one has to visit their houses and handle their everyday utensils and implements to realize how deep-seated is their feeling for beauty. The methods they adopt to embellish the person are fully described by Dr. Furness. No special objection, even from an European point of view, can be made to the tattooing; but certainly, to our eyes, the artificial dilation of the lobe of the ears, especially great in the women, is decidedly unpleasing. One soon gets accustomed to black teeth, and they do not look amiss even when decorated with brass studs.

Replete as the book is with facts for students of mankind, there is little in it for the pure geographer. There are occasional allusions to scenery, and there is one excellent plate representing the moss-covered jungle on the summit of Mount Dulit (5000 feet), which has already been alluded to by Dr. C. Hose (*Geographical Journal*, vol. i. p. 193).

It is not rash to predict that this book will always be regarded as a standard work on the family life of an unspoiled, honest, simple people, who, despite head-hunting proclivities, are essentially a kind-hearted folk.

A. C. Haddon.

India.

'The Forests of Upper India and their Inhabitants.' By Thomas W. Webber. *With Maps.* London: Arnold. 1902.

Readers who take up this book with the expectation of finding in it a systematic treatise on the forests of India will be disappointed—agreeably or the reverse according to their own particular standpoint. The book is in reality a record of the writer's personal experiences when engaged in work in the Indian forests during the early days of the Forest Administration some forty years ago; and as he was evidently an intelligent and careful observer, and, in addition to his professional duties, devoted himself assiduously to the study, under its natural conditions, of the varied life—both of men and animals—with which he was brought in contact, he has much to tell that is thoroughly worth reading. The life of a forest officer in those days was particularly favourable for studies of this kind, and the fact that the means of locomotion were then more primitive than at present, gave him far more opportunities for gaining a thorough knowledge of the country than are possessed by those who use the modern facilities for rapid transit.

Mr. Webber's story has to do with two different regions, the first including the Himalayan and sub-Himalayan forests of Kumaon and the Nepalese borders; the second embracing parts of Bandelkhand and the Central Provinces, with the Nerbada valley between. The first naturally presents the greater attraction on the score of variety, for Mr. Webber's picturesque descriptions take us from the hot and reeking jungles at the foot of the range, through the regions of the *Pinus longifolia* ("chir") and *excelsa*, of silver fir and spruce, to the great snowy peaks and the Tibetan district of Hundes, to which he made his way across the snowy passes. This alpine region was then naturally much less known than it is now, and Colonel Smyth, with whom Mr. Webber made his trip into Tibet, had only recently selected, from the Bhotia schools under his inspectorship, the first of the native explorers who were soon to add so much to our knowledge. Mr. Webber

draws many fascinating pictures of the life and scenery of these regions, especially vivid being his descriptions of the tiger-haunted jungles at the foot of the hills, with their teeming bird-life; of the great "chir" forest, with its heat and wearisome monotony; and of the wide Tibetan plains, with their crude colouring, thin air, and remarkable sunsets. The section dealing with the Central Indian forests on the Pachmari and Seoni plateaus is hardly inferior in interest, and a particularly graphic description is given of a hunt by wild dogs of which the author was witness. Much interesting information is given throughout on the primitive forest tribes with which the author was brought in contact. Occasionally, perhaps, we are tempted to think that some slight liberties have been taken with the grouping of the pictures, as when the scarlet blossoms of the leafless cotton trees are introduced among the features of a *June* landscape. We may regret, also, that more attention is not paid to the life-conditions of vegetation in the different regions, for it is only occasionally, as at p. 232, where the various contrivances which secure the trees against overthrow by the Indian storms are described, that this subject is touched upon. A series of pictures illustrating the different types of forest would have been a valuable addition to the book. The botanical nomenclature is not always quite up to date; thus the generic name *Picea* is still applied to the silver fir, while Roxburgh's names for the cotton tree and the "saj" are retained.

Taken as a whole, however, the book is a welcome addition to the literature on India, for whereas systematic treatises on the geography, statistics, and natural history of the country are numerous, the art of picturesque description of its natural features has, as is so often the case, been practised by but few. A word of praise must be given to Mr. Webber's sensible remarks on the subject of sport, for while a keen sportsman himself in the best sense of the term, he has nothing but reprobation for the indiscriminate butchery practised by so many, which he likens, with some justice, to the slaughter of pigs—at so many the hour—at a Chicago bacon factory. His observations on the neglect of forestry in other parts of the British Empire are also very much to the point.

China.

'Through Hidden Shensi.' By Francis H. Nichols. London: Newnes. 1902.

The interest of this book lies principally in the striking picture it presents of the life and character of the dwellers on the great plain of Shensi—the oldest element, apparently, in the population of modern China. The author is an American who went to China to report on the Shansi famine, on behalf of those philanthropic persons in the United States who had raised a fund for the relief of the starving population. He describes his book as "an attempt at a picture of Oldest China and its people as I saw them in their land—sowing, reaping, toiling, thinking, and misjudging the world beyond their mountains as persistently as that world misjudges them." He describes how he approached his task with all the prejudices of the foreigner, and how, when compelled to meet the people on their own level, his interest in them was aroused so that he came in time to see things from their point of view. It is this power of adapting himself to the standpoint of the people of whom he writes which gives the book its value, and which, though it may perhaps occasionally carry the author too far in his favourable judgment of Chinese as opposed to European civilization, should do much to modify too hastily formed views with a contrary tendency. Mr. Nichols considers that much good might result from giving the Chinese "the benefit of the doubt" more often than is done; and the account given of the way in which, during the late troubles, the Shensi people gave their moral support to their mandarin, Tuan Fang, in his

defence of the missionaries—at the risk of his own life—might certainly lead some to reconsider their verdict respecting the Chinese. Food for reflection is also supplied by the description of Sian (Singan-fu), which is said to have "no haunts of crime and human degradation," nor "any rendezvous of gilded vice and dissipation;" and by the remark of an old Mohammedan tea-merchant, who, after expressing his willingness to see the Christians overthrow the idols, added, "the only trouble is, if Sian were a Christian city it would be as bad as Shanghai.'

Mr. Nichols paid a visit to the celebrated Nestorian tablet in Sian, which does not seem to have been seen by any recent travellers, and which stands at present amidst a heap of ruins, protected neither from vandals nor from the elements. Photographs of the monument are given.

Siberia.

'Das russische Kustengebiet in Ostasien.' (Primorskaja Oblastj.) Von C. von Zepelin. Berlin: Mittler & Son. 1902.

The fact that so much of the existing literature on Eastern Siberia is in Russian gives a value, beyond that which attaches to most compilations, to this concise summary of our knowledge about that region. A sketch is given of its history and surface features, but the bulk of the work is devoted rather to the economic aspects of the country. The writer has a high opinion of the resources of the Eastern Coast region, though he allows that their development will be a matter of time. The political position of Russia in the Pacific is, he thinks, assured by the opening of the Siberian railway.

AFRICA.

North and East Africa.

'Travel and Sport in Africa.' By A. E. Pease. 3 vols. London: Humphreys. 1902.

On viewing the imposing form and sumptuous get-up of these volumes, it is impossible to avoid regret that the amount of solid scientific matter contained in them can hardly claim to be commensurate with the outside appearance. A large proportion of the volumes is taken up with sporting or other incidents of travel, and while the former will no doubt appeal to a certain class of readers, serious students will be tempted to wish that the solid material had been more carefully sifted out for their use from the general mass. Many of the illustrations with which the work is so lavishly provided are instructive, and some (particularly in the case of the photogravures) are of real merit, though the same can hardly be said of many of the text illustrations. Still, even in its more trivial side, the work has a value from the picture it presents of the state of the countries traversed when the recent advance of European influence was only just beginning, while a particularly pleasing feature is the author's sympathetic attitude towards the native races, and his evident desire to further the good repute of his country among them.

The arrangement of the work is chronological, the author's various expeditions being described in the order in which they were undertaken, which involves some amount of see-saw between different parts of the continent. The bulk of vol. i. treats of journeys in Algeria, during which the interesting Aures group of mountains was visited. The rest of the volume and the first part of vol. ii. takes us to Somaliland, this section opening with a general account of the people, their country, and its animal and vegetable productions. Mr. Pease's routes in Somaliland led through some little-known country, and this part of the work possesses, perhaps, the greatest original value. The latter part of vol. ii. brings us to the

Algerian Sahara, where the oases of Ghardaya, Gerrara, and Wargla were visited, and as recent literature on this region is almost entirely French, the views and impressions of an English traveller are of considerable value. Vol. iii. deals with Abyssinia, into which, however, the author and his party did not penetrate further than Adis Ababa and Lake Zwai. Mr. Pease was struck by the absence of all appearance of a town at the capital, the native huts being widely scattered over the valley. He is evidently by no means so enthusiastic an admirer of the Abyssinians as some recent travellers. In each section of the work lists of animals, birds, and plants are given, but with respect to the last, it is to be regretted that in few cases have botanical determinations been possible. Short historical summaries are here and there inserted, and will no doubt be of use to the general reader. The maps, prepared at Stanford's establishment, deserve a special word of praise.

Italy and Abyssinia.

'The Campaign of Adowa and the Rise of Menelik.' By G. F. H. Berkeley. Westminster: Constable. 1902.

It may seem at first sight that the interest in the events which finally freed Abyssinia from the threats of an Italian protectorate is hardly fresh enough to warrant the publication of an English narrative of the campaign, now become a matter of history merely. The lessons of the campaign are, however, not without importance for the future, owing to the undoubted influence on the fate of the surrounding European territories, which the rise of a powerful military empire under Menelik must exercise, whether or no the anticipations will be realized of those who see in the Abyssinian empire a source of danger to her European neighbours. Mr. Berkeley's account of the campaign embodies a large amount of material which has not been generally available to English readers, both with respect to the actual campaign and the events which led up to it, and may be recommended as a trustworthy guide to those who wish to gain a comprehensive view of the events described.

Egypt.

'Egypt painted and described by R. Talbot Kelly.' London: A. & C. Black. 1902.

Mr. Kelly's pleasantly written descriptions of Egyptian life and scenery will bring the general characteristics of the country before the minds of stay-at-home readers with peculiar vividness. But it is the thoroughly artistic coloured illustrations which are the special attraction in the book, and which will probably be somewhat of the nature of a revelation to those not familiar with the scenes themselves. So much of the charm of Eastern scenery depends on the colouring that photographs, however excellent, can convey but a slight idea of the reality. Vivid as are the colours employed by the artist, they are so harmoniously blended that harsh and startling effects are altogether avoided. Much as he is inclined to regret the modern vulgarization of things Egyptian, which seems to have brought a subtle change over the spirit of the scene, Mr. Kelly is enthusiastic in his praises of the natural beauties which remain, and of the interest attaching to a study of native life where comparatively uncontaminated by the new influences. The pictures of Nile and desert scenery, in their ever-changing aspects, are drawn with particular vividness, but the author's descriptions all manifest the true feeling of the artist, and among the many charming sketches, that of the changing aspects of nature on the banks of one of the smaller and more secluded canals, is perhaps as attractive as any. More practical questions are now and then touched upon, and the remarks on such subjects as the recent experiments at

tree-planting, no less than those relating to the general condition of the people, will be read with much interest.

AMERICA.

Alaska.

'Harriman Alaska Expedition.' 2 vols. New York: Doubleday, Page & Co.; London: John Murray. 1901.

These two handsome volumes afford an argument of great force upon the question of "how to spend a summer vacation." While it is true that few of us are millionaires, able to pick up a party of enthusiastic scientific men to work either for us or themselves, we can all spend the time of relaxation, when it comes, in useful, profitable work. Not all expeditions which have been merely backed by money have been successful; something more is needed which money cannot buy outright, particularly in another line of work, and that is organization and direction. Granted all these conditions fulfilled, and there is still another rock upon which many parties have split—namely, lack of harmony. The Harriman expedition seems to have had all the above conditions reasonably well met, and, considering the size of the company, this was somewhat remarkable. If this example, on such a scale, could only induce the ordinary mortal in a smaller way to have some "hobby" of his own which he could develop in his leisure time, it is perfectly certain that there would be more satisfaction and less "ennui" in the life of the everyday man. The volumes are also an evidence of how much can be compressed into a comparatively short time. Two months were occupied by the trip after leaving Seattle, and although some six hundred species new to science were secured, it is safe to say that the resources of Alaska have not been by any means exhausted. This party of trained specialists possessed an unsurpassed equipment and a vessel with a sufficient working force, which enabled them to avoid the delays so common and so annoying in ordinary work of this sort.

The illustrations of the volumes are of very high artistic as well as scientific value, though it is a pity that space should be taken by repeating illustrations when such a tremendous wealth (five thousand negatives) was at hand to be drawn upon. As a book of travel, it contains much less of rubbish and more of value than is usually the case. The first volume is taken up with three distinct papers, in addition to the account of the organization of the expedition. The narrative of the trip is provided by John Burroughs, who is fortunate in his style, and he is to be congratulated on avoiding the "diary" method, so tiresome in most travellers' books. One feels that he must have expressed the sentiments of the whole party when he closes with the remarks, "No voyagers were ever more fortunate than we. . . . We had gone far and fared well." In the next paper upon the Pacific coast glaciers, we have an all-too-short account of these interesting ice-masses. John Muir should have given us more than sixteen pages upon this subject, in which he is a most eminent authority. The volume closes with an account of the natives of the Alaska coast region by Geo. B. Grinnell, the editor of *Forest and Stream*.

The second volume is devoted to the history, geography, and resources of Alaska. Discovery and exploration, by Dall; birds, by Keeler; forests, by Fernow; geography, by Gannet; atmosphere, by Brewer; our newest volcano, by Merriam; the salmon industry, by Grinnell; fox-farming, by Washburn; while Dall breaks into song at the end of the book. The illustrations of the birds by Fuertes are particularly fine. These papers are only such as would appeal to the interest of the general public. The technical papers, of which twenty-two have already

appeared in the *Proceedings of the Washington Academy of Science*, will be brought together later in a series of technical reports which will fill several volumes. They will cover the fields of geology, palæontology, zoology, and botany; they should make a valuable contribution to science, and give a well-earned reward to time, money, and energy well expended.

WILLIAM LIBBEY.

COLOMBIA.

'Nueva Geografía de Colombia.' Por F. G. Vergara y Velasco. Tomo i. Geografía General, Bogotá. 1902.

This royal 8vo, of about 1100 closely printed pages, although claiming to be only a geography, treats extensively of the physical features of Colombia, productions of the soil, geology, mineral wealth, commerce, history, ornithology, fauna, flora, ethnology, and geography of the neighbouring states of Venezuela, Ecuador, and Brazil. It is extensively illustrated with locally engraved views and small page maps which are interesting and valuable. Its usefulness is somewhat impaired for want of proper classification of the immense quantity of useful data it contains, while the small type, poor paper, and crowded pages make its study difficult. The labour of collecting its varied information must have been prodigious, and the author merits the highest praise for his industry and perseverance in a task which must have required interminable patience, more especially in a land where knowledge of value is hard to acquire, and frequently almost impossible to verify. Aside from this, probably the obstacles to the printing of such a volume at Bogotá, in the midst of one of the most sanguinary civil wars Colombia has known, must have been formidable; but, with the scantiest means, it has been published, "for account of the Government, in the printing office of the *Boletin Militar*." The aid thus extended to the author speaks well for the intelligence of the rulers of the state, and if it can produce such an important work under such great disadvantages, we may hope that, when peace again smiles on that land of marvellous resources, we may find Señor Vergara's facile and intelligent pen entrusted by the Government with the task of dividing his great 'Geography' into several volumes.

G. E. C.

PACIFIC.

MARSHALL ISLANDS.

'Die Stabkarten der Marshall-Insulaner.' By A. Schück. Hamburg: H. O. Persiehl. 1902. Fscap, 37 pp. and 11 pls.

With characteristic German thoroughness, and after much correspondence with museum curators all over the world, Herr A. Schück, of Hamburg, has studied all the material he could gather concerning the stick-charts of the Marshall islanders. It has long been known that these skilful navigators construct frameworks of thin sticks of wood or strips of bamboo to serve as charts. Some of the sticks constitute the frame, while the others indicate the directions of the currents, together with the tracks to be taken by the canoes when sailing from one atoll to another in the group. At appropriate relative spots are fastened small shells, stones, seeds, or even knots of thin string to represent the atolls or islands. When the skeleton charts are held in an appropriate direction, which at night can be determined by the pole-star, the mariners know in which direction to steer in order to fetch the island for which they are making. Some of the charts are employed to instruct the lads in the geography of this island group; others are charts that include the

Ratak and Ralik chains of islands in the Marshall group; others, again, are confined to the Ralik chain, while some take in only the southernmost islands. A von Chamisso first discovered a map at Guam about 1817, which related to Ulea, in the Caroline group, but no further inquiries appear to have been made. In 1862 an American missionary, Dr. L. H. Gulick, who resided in Ebon, gave a short but very good account of these charts, which was published in a missionary paper and in the *Nautical Magazine*, vol. 31, p. 304. The first specimen appears to have been brought to Europe by Consul F. Hernsheim, who published an account of it in his 'Beitrag zur Sprache der Marshall-Inseln,' 1880, p. 88. Since then several descriptions have been published. This careful study by Herr Schück is illustrated by seven plates, containing figures of forty-seven stick-charts, and one plate of Marshall island canoes. The remaining three plates are from material supplied by Dr. A. C. Haddon, which demonstrates that although the Papuans of Torres straits do not make sailing-maps, yet they have a fair idea of the geographical features of this district, which they can depict with intelligence. The islands at which a culture-hero stopped, on his way to Murray island from the west, are recorded by stones in a sacred spot, the meaning of which is taught to the lads when they are initiated. Herr Schück has published a paper entitled "Die nautischen und astronomischen Kenntnisse der Bewohner der Karolineninseln" (*Aus allen Weltteilen*, 1882), for which he was specially qualified by his experience as a practical mariner; but he is known mainly for his laborious work in calculating, mapping, and discussing magnetical observations.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Geomorphology.

'Wissenschaftliche Charakteristik und Terminologie der Bodengestalten der Erdoberflache.' Von August Neuber. Vienna and Leipzig: W. Braumüller. 1901.

This bulky volume, which is the outcome of twenty years' study on the part of the author, is largely polemical in character. Field-marshal von Neuber, who occupies a high place as a military topographer, has long been convinced of the unsatisfactory character of existing terminology respecting the forms of surface of the globe, and this opinion has been strengthened rather than diminished by the publication of Baron von Richthofen's 'Führer für Forschungsreisende,' and Prof. Penck's 'Morphologie der Erdoberfläche,' in which those writers put forward their respective schemes of classification of the morphological features of the Earth. He is inclined to lay the blame on the insufficient knowledge possessed by most geographers of the science of topography, on which he has already published a volume, and which, he holds, can only be properly understood by those who have themselves had a thorough practical training in the representation of the surface features on maps. In the present volume he gives a detailed review of the forms, both of water and land, on the surface of the globe, frequently criticizing the views of his predecessors, and setting forth his own ideas as to the most rational scheme of classification. The greatest objection to the book, from a practical point of view, is the difficulty of arriving at any notion of the general principles on which the author proceeds in his task, for he begins at once with the detail of his subject, and it is only with regard to individual features that we are able, without wading through the six hundred odd closely printed pages, to learn the grounds on which he is at issue with generally accepted methods.

OCEANOGRAPHY.

In Indian Seas.

'A Naturalist in Indian Seas.' By A. Alcock, M.B., F.R.S. London: Murray. 1902.

In this book we have a most fascinating and complete popular account of the deep-sea fauna of the Indian seas. The book is one of intense interest throughout to the zoologist, but at the same time its matter is arranged in such a form that no special knowledge is required from its readers. The natural history of the forms is dealt with in a broad spirit, and the author has not hesitated to indicate how the structure of the various animals is, in his opinion, especially adapted to their physical environments. Scientific accuracy has been everywhere retained, while the matter is fully explained both in the text and by a most admirable series of illustrations.

On the geographical side brief indications are given of many considerations of the greatest importance, which the author, to our regret, has, in spite of his great experience, not pursued. Foremost among these is the question of the connection of the Indian and Atlantic oceans in the Tertiary period, in reference to which many instances are given of animals common to both seas. The author, indeed, gives internal evidence that he has considered this question deeply, but, failing to see the great general interest of the subject, has not cared to treat the question in a book which professedly deals with natural history alone.

The Indian seas are divided into three parts: the Laccadive sea, the Bay of Bengal, and the Andaman sea. Of these, the first two are open to the ocean to the south, and hence, in their fauna, are of no particular interest. Their bottom temperatures gradually decrease down to 35° Fahr. at about 1800 fathoms, but the greater part of the Laccadive sea lies within the 1200-fathom line. The Andaman sea, on the other hand, is an enclosed sea, attaining a depth of upwards of 1700 fathoms, and a temperature of about 41° Fahr. at 800 fathoms, below which there is practically no further decrease. There would, then, seem to be of necessity a ridge of less than 800 fathoms in depth, preventing a free circulation of water between the greater depths of the ocean and the Andaman sea. This is shown to be the case by soundings of 736 fathoms between the Andaman and Nicobar islands, and of 760 between the latter and Sumatra, while the Malacca strait does not attain a greater depth than 100 fathoms. The Andaman sea, then, would seem to be the most northern of that series of deep and enclosed basins which separate the East Indies into two lines, and of which the Bali-Flores and Banda seas have lately been shown by the Siboga Expedition to be examples.

A good picture is given, in the course of the work, of the bottom of the Bay of Bengal, but the deposits are very lightly treated of. The presence of a continuous bed of "greensand" within and between the Laccadive islands from about 700 to 1100 fathoms is not without interest. The land deposits extend out from 60 to 300 miles from the Indian coasts, and 100 miles to the west of Middle Andaman island, fragments of rude earthen pottery and numerous decomposing leaves were dredged from 1644 fathoms. The richest ground for the zoologist was found between 200 and 1000 fathoms, not too far from the shore; but the whole work of the *Investigator*, the survey ship of the Indian Marine, indicates enormous economic possibilities for well-equipped steam-trawlers operating down to the lesser depth.

Among the more isolated islands, Dr. Alcock landed on and has a few remarks to make about the Cocos, South Sentinel (a coral reef raised a few feet above high-water mark), and some of the Laccadives. *All* the latter are considered to be the remains of eroded atolls; but the author's meaning is not clear, and he has evidently not considered the submerged banks of the group. Considerable banks of pumice

are not uncommon features of the islands of the Maldive group and Pacific Ocean, as well as of the Laccadives. Minikoi is scarcely the paradise which it has been depicted, though the people always put their best side foremost. The land is equally divided between the government and the people. The latter's half has eroded away so rapidly that it is probably not the third of its former size, while the government portion has grown. The former part is completely tilled, while the "crown lands" are absolutely uncultivated and going to waste. The young men are sent away to provide the rice which is necessary for their families' maintenance. Considering the available land, the population is denser than that of any part of India. And, finally, the state of continual anxiety in which the people of Minikoi live is far more fatal to them than the storm-waves that once in a century decimate the population.

J. Stanley Gardiner.

CARTOGRAPHY.

Map Projections.

'Maps: their Uses and Construction. A short popular treatise on the advantages and defects of maps on various projections, followed by an outline of the principles involved in their construction.' By G. James Morrison, M.I.C.E., F.R.G.S. Second Edition, revised and enlarged. London: E. Stanford. 1902.

The first edition of Mr. Morrison's little work on map projections was reviewed in the *Geographical Journal* for November, 1901, and it is satisfactory to find that, in accordance with suggestions there made, a great deal has been done in this second edition towards rendering it more generally useful and complete.

The first chapter remains much as it was before. The second has been revised, and a description of an elliptical projection (Mollweide's) added. The third chapter has been considerably enlarged and rearranged, among the important improvements being more complete descriptions of the Stereographic and Mercator's projections. The account of the conical projection has also been expanded. Chapter iv., dealing with projections of small areas, has been entirely re-written. By the introduction of various tables, Mr. Morrison has further improved his work, although some of these, such as that of meridional parts, are somewhat too short and incomplete to be of great practical value. This second edition is a decided advance upon the first, and in its present form the work constitutes a useful little introductory handbook to the subject of map projections. The author does not pretend that it is more than this, and those who desire to go more fully into the matter should consult the writings of Germain, Clarke and others.

Map-drawing.

'Memory Map-drawing.' By a Professional Teacher. (R. G. Scanlan, Pialba State School, Queensland.) Halifax: Blatchford Brothers. 1902. Pp. 28.

The suggested memory-aids in the form of guide-lines and pictures may be of use to some teachers who may not have the time to evolve a system of the kind for themselves. A more valuable feature is the attention given to the projection of maps, which is entirely neglected by too many teachers, but which, with the aid of the tables supplied by the author, is quite within the reach of intelligent children. Memory map-drawing is no doubt valuable as supplying a basis of topographical knowledge on which to build further study, but care is necessary lest too much attention be given to it at the expense of other branches of geographical teaching.

GENERAL.

The History of Geography.

'The Discoveries of the Northmen in America, with Special Relation to their Early Cartographical Representation.' By Joseph Fischer, S.J. Translated from the German by Basil H. Soulsby, B.A. London: Henry Stevens. 1903.

The German original of this important work has already been reviewed in the *Journal* (vol. xix. p. 746), and it is therefore unnecessary to enter into details respecting its general scope. Both the translator and publishers deserve the thanks of English readers for their promptness in putting into their hands the results of Prof. Fischer's investigations, the interest of which is not confined to the more special subjects treated of in the present work, but is perhaps derived still more from the light incidentally thrown on the wider field of the geographical revival of the fifteenth and sixteenth centuries. In this connection a few points not touched upon in our former notice through considerations of space may be here alluded to. Prof. Fischer's greatest achievement in the field of historical geography is, of course, his discovery of Waldseemüller's splendid maps of 1507 and 1516, and pending the eagerly expected publication of facsimiles of these, the reproduction in the present work of one of the sheets of the former (with its inset of the world according to Ptolemy), gives some idea of the style of the maps, some account of which is also contained in the text. But an almost equally important contribution is the light thrown on the life-history and geographical work of Donnus Nicolaus Germanus, hitherto known erroneously as Nicolaus Donis,* the editor of several editions of Ptolemy, including the famous Ulm editions of 1482 and 1486. To Prof. Fischer has been due the discovery (made, like that of the Waldseemüller maps, at the Wolfegg library) of a unique manuscript copy of one of Donnus Nicolaus' editions, which he has proved conclusively to have served as the prototype of the Ulm editions. The world-map contained in this manuscript is reproduced in the present work, together with other maps by Donnus Nicolaus. The important influence exercised by this cartographer on the geographical knowledge of his day is shown by the fact that his first edition of Ptolemy, of which manuscripts exist at Modena and Paris, is held by Prof. Fischer to have been the prototype of the Rome editions of 1478 and 1490, while maps of the well-known Canerio or Cantino type are attributable to his second edition, preserved in manuscript at Warsaw and the Vatican.

The style in which the work is produced fully sustains the reputation of former publications by Mr. Stevens's firm, and its moderate price (8s.) will make it widely available. An excellent index, not given in the German edition, has been added, together with a few extra bibliographical references. The only drawback is the absence of subject headlines (supplied in the German edition), which do much to facilitate reference.

THE MONTHLY RECORD.

EUROPE.

Underground Water-supply of the Home Counties.—A pamphlet furnished by the Underground Water Preservation Association brings to notice

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* Donnus being the equivalent of the Italian Dom, the designation of a lay brother.

a question of extensive interest to geographers, and especially to geologists, while at the same time seeking to demonstrate an economic abuse of the gravest nature. Certain daily and other journals have recently given light to the fact of the serious depreciation of wells, springs, and the headwaters of streams in the high-lying lands which surround the London basin; along the line of the Chilterns, in Berks, Bucks, and Hertfordshire; in Essex; and in the Kentish uplands. In these parts for some years past, wells and springs which furnish the local water-supply to villages and farms have been found to diminish or wholly fail of their supply in a way unprecedented as far as memory or history serves, and unaccountable on the score of deficiency of rainfall or any natural cause. This fact (which has come under the notice of the writer of this paragraph in the case of the Beane, the Mimram, and other feeders of the Lea) the Association sets out to explain as a result of the injudicious taxing of the subterranean water-supply in the chalk by certain of the water companies supplying London. The work of the Association originated in Kent, and thence enlarged its scope. The pamphlet sets forth its objects: to prevent the abstraction of water by companies to the detriment of local interests; to suggest the best means of preserving the local supply in any special case, and the best position for companies' pumping stations with this end in view; and to prevent companies from obtaining Parliamentary powers of which the exercise would be detrimental. The history of the formation of the Association, its distinguished patronage, and its work up to the present are set forth, together with expert reports on the whole question, press extracts, and an account of a deputation to the Right Hon. W. H. Long on the subject, while copious appendices give lists of members and guarantors, also rainfall tables from Greenwich and stations within the affected areas. No sentence shows in a clearer light the deep importance of the question, than that which instances the removal of country families to the metropolis owing solely to the shortage of water in their homes.

The Pyrenees and the Distribution of Animals.—A paper on the influence of the Pyrenees on animal distribution was read by Dr. R. F. Scharff, of Dublin, at the Berlin Meeting of the International Congress of Zoologists in 1901, and has since been issued as a reprint from the proceedings of that body. After pointing out that ranges which run from east to west like the Pyrenees have a greater influence on animal distribution than others, owing to the fact that they stand in the way of northward or southward movement resulting from climatic changes, and noting that identical species on the two sides of the range may either have taken a circuitous route round its ends or crossed the crest when it was lower or subject to a still milder climate than at present, Dr. Scharff instances the present distribution of certain forms as indicating the probable routes of former migrations. In the case of animals like the chamois, which he considers to have crossed the Pyrenees from the east and spread over the Cantabrian mountains within comparatively recent times, there is, of course, nothing surprising in the fact that the range has proved no barrier, but it is otherwise with some of the instances given from among the reptiles and still lower groups. Many western forms of these have, however, crossed into France, in some cases, no doubt, by the lower hills at the extremities of the chain, while eastern forms have also made their way into Spain. The most striking instances are, perhaps, those of similar migrations by amphibia, whose movements are subject to many difficulties. Among the salamanders, *Molge marmorata* and *M. palmata* seem to have been limited within comparatively recent times to Spain and France respectively, but each has now crossed the range, though in small numbers. These seem to have utilized the lower western spurs as a point of crossing; but an older form (*Salamandra*

maculosa) has evidently crossed the crest of the range, and was found by Dr. Scharff at an altitude of 1800 metres (5900 feet), on the pass of "Le Somport." The distribution of *Molge aspera* is interesting as favouring the view of a former connection between the Pyrenees and the mountains of Corsica and Sardinia, possibly in Mesozoic times. Dr. Scharff arrives at the general conclusion that, though causing some hindrance to animal migration, the Pyrenees can be easily turned at their two extremities, and that the older forms have, as a rule, crossed the crest of the range, probably, in most cases, before the glacial epoch.

The Kaiser Wilhelm Canal.—The report on the traffic of the Kaiser Wilhelm canal, recently issued by the German Government, gives the statistics for the year ending March 31 last. No great development in the traffic has taken place. While in the previous year the total number of vessels of all sorts using the canal was 29,045, of an aggregate tonnage of 4,282,094 tons, that of the year ending in March last was 30,161, and the tonnage 4,285,301. It appears that there was a decrease of tonnage in British, German, Belgian, French, Norwegian, and Swedish vessels, but an increase in Danish, Dutch, and Russian. The total receipts of the canal amounted to £106,351, and the expenses to £121,141, a decrease having taken place in both.

Commercial Education in Austria.—We extract the following from a recent publication of the Ministry of Education in Vienna, dealing with the distribution of commercial schools in Austria. The organization of these schools has been in the hands of the state since 1888. At the present date (end of 1902) there are in existence 186 schools in 117 different localities; 23 higher commercial schools (*Akademien*, etc.), and amongst these 44 composite schools. Most of these are private schools, a small proportion of which are endowed by the state, while a very few are Government institutions. The importance of Vienna as the commercial capital of the country is recognized by its supply of 18 schools, of which 2 are "higher" and 12 composite. Prague, as centre of the chief industrial and commercial crown lands of the western half of the kingdom, has 18 commercial schools, of which 2 are higher, and 1 composite. The relatively large number of schools in Bohemia is due to the rivalry of the two languages—German and Czech. Bohemia possesses 83 schools in 54 towns, forty-five per cent. of the total for the whole of Austria, chiefly congregated in the north-west. Next comes Moravia with 28 schools in 17 towns, and then Lower Austria with 26 schools in 9 towns; Styria has only 10 schools, distributed in 7 towns. Bukowina, the most easterly, and Dalmatia, the most southerly, of the crown lands, have only one school each. The great preponderance of the German element in commercial affairs appears from the fact that German is spoken in 122, or sixty-six per cent. of the schools. In 48 schools (twenty-six per cent.) the Czech language is employed. Both languages are used in the teaching in 10 schools. Four schools, of which three are "higher" (in South Tyrol, Trieste, and Cattaro), use the Italian language. Polish is spoken in the academies of Lemberg and Cracow. The relatively large proportion of non-German academies (18 out of 23) shows how uniform is the effort to provide adequate educational training for each of the great linguistic divisions of the people.

Professorial Appointment in Vienna.—Dr. Eugen Oberhummer, professor in the University of Munich, has been appointed to the chair of historical geography in the University of Vienna, vacant by the death of Prof. Tomaschek. Dr. Oberhummer was born in Munich in 1859, and has made journeys in the Nearer East, publishing an important memoir on Cyprus. He is regarded as a special authority on the geography of ancient Greece, and has recently interested himself in the history of cartography, especially of the Alps.

Emigration from Southern Italy.—A recent official report draws attention to the extraordinary depopulation now going on in the province of Basilicata. With a population of about half a million persons, most of whom are engaged in agriculture of a most primitive kind, it covers an area of about 3000 square miles. It is ravaged by malaria, and vast districts of it have been confiscated by the state for non-payment of taxes. The forests have been largely destroyed, but the rivers, which might be utilized for irrigation, have hitherto been left untapped. It is stated that more than half the arable land is in the hands of the state, which means that it has reverted to the condition of prairie. In the first three months of 1902 no less than 22,000 emigrants left the provinces.

The Over-population of Poland.—The population of Poland, according to a recent report of our Consul-General at Warsaw, is as much as 192 to the square mile—a density not only greater than that of any other province of the Russian empire, but even more than that of the neighbouring Prussian provinces and of France. The holdings of the peasants are so small that it is almost impossible for them to make a living by agriculture. While in the United Kingdom 17 per cent. of the population look for a living in the fields, in Germany 40 per cent., and in France 47, 66 per cent. are tillers of the soil in Poland, and the wage average is only 9*d.* per diem. High rents prevent peasant ownership, and of the total rural population of 9,000,000 there are 850,000 males of the peasant population who have no land at all, and some 660,000 more whose land will not keep them. The production of corn is continually becoming less and less sufficient for the support of the population, and extensive emigration accordingly takes place.

ASIA.

Lake Baikal.—The exploration of Lake Baikal by M. F. K. Drizhenko was commenced in 1896, and a note on the first year's preliminary investigation was published in the *Journal*, vol. xi. p. 144. Since then M. Drizhenko has visited the lake every year with a party of assistants, and has made detailed surveys of the shores, determined several positions astronomically, and executed triangulation and plane-table surveys, besides magnetic and temperature observations. The longitude of Listvenichnoye was ascertained to be 2′ 17″·4 east of Irkutsk, with a probable error of ±0″·04, and nine points in all were determined by astronomical observation. In examining the southern shore east of Utulik, a submarine ridge over 5 miles long at a depth of 8 fathoms was discovered, where fishing-boats can anchor and set their nets. The Maloye More, between Olkhon and the western shore, is 46 miles long by 9 broad, and is an excellent refuge for boats during storms, and the Olkhon gate is easily navigable. To the north of the Maloye More the western shore offers few facilities for anchorage, the water being deep and the bays exposed. On the eastern shore the bottom slopes more gradually, and there are several good harbours. Among these are the Davsha and Sosnovka bays, and the Chivirku gulf with a depth of 300 fathoms at the mouth, gradually shallowing to 10 feet and less at the upper end. The last has several bays inaccessible to steamers owing to shallows at the entrances, but the Bezimannaya is convenient and sheltered. The Barguzin bay is shallow, and the water is rough when the wind is south-west. Further south to the Bezimannaya bay, the coast is dangerous. This bay is sheltered, and has good anchoring-ground, whereas the Gorachinskaya is exposed, and anchors drag there. Boats put in because of the proximity of the mineral springs in the Turka valley. Several parts of the coast had not been thoroughly examined at the end of 1901, to which period M. Drizhenko's report in the *Izvestiya*, No. 2, 1902, extends. The soundings in the middle and southern

parts of the lake were incomplete, and the survey of the delta of the Selenga, etc. An examination of the Upper Angara valley is also desirable, with a view to the construction of a road to the Vitim. At present goods for the Vitim goldfields are conveyed from the railway at Tuiret to Zhigalovo (265 miles), and thence at high water in the spring and autumn 700 miles down the Lena and 200 miles up the Vitim to Bodaibo, whereas by Lake Baikal the distances would be 330 miles on the lake, 150 miles on the upper Angara to the mouth of the river Churo, and thence by land 130 miles to Bodaibo, or a total distance of not much more than 600 miles. Not only would the distance be shorter, but the traffic would be independent of the level of the rivers, the time of transit shorter, and the cost half or a third what it now is. The following publications are to be issued: a general map of the lake on the scale of 12 miles to an inch; maps of the northern, middle, and southern sections on the scale of 2 miles to an inch, of which the first two are already issued; an atlas of sections on the scale of about 2 miles to 3 inches, showing the coastal strip with anchorages, etc.; and a sailing directory. Several lighthouses have been erected.

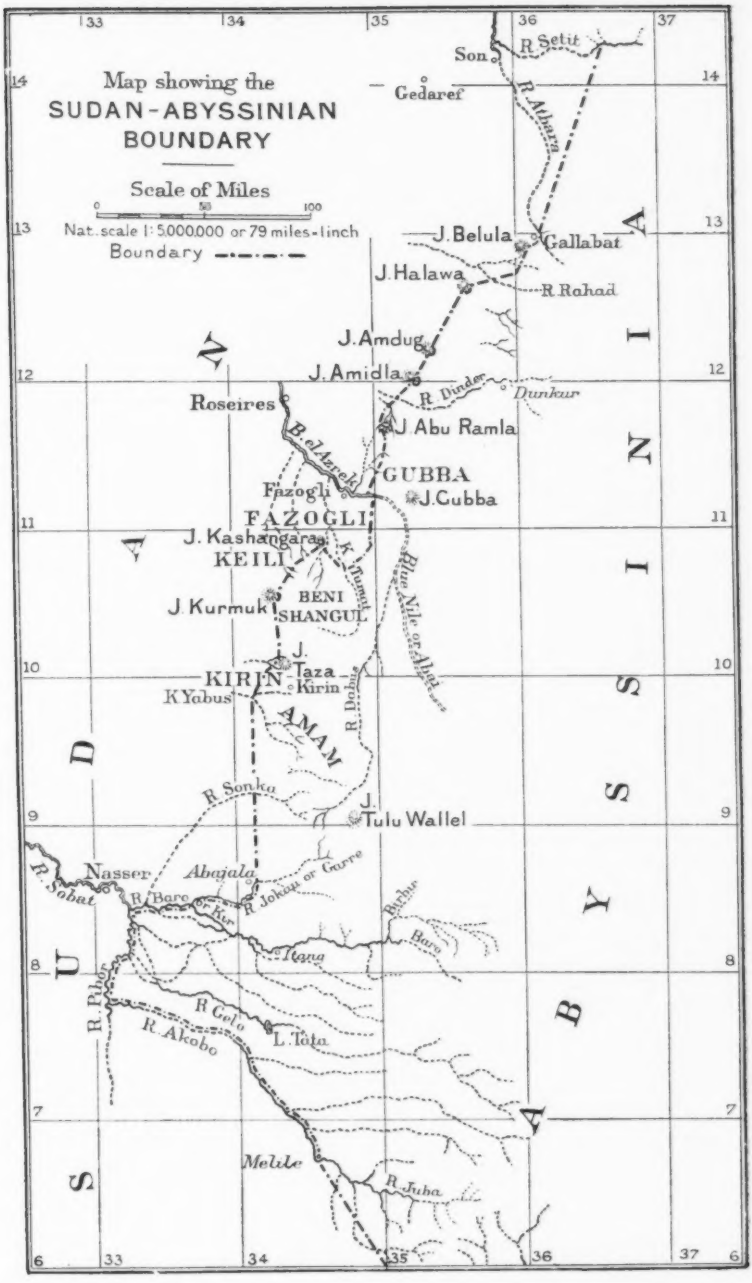
AFRICA.

Jebel Garra and the Kurkur Oasis.—From the Survey Department of the Public Works Ministry of Egypt there has been issued (Cairo, 1902) a pamphlet on the results, topographical and geological, of a recent survey of this little-known district in the neighbourhood of Assuan. The Nile is here flanked by the dreary sand-covered plains of the Nubian sandstone, undulating and very gently rising from the river-level. Journeying across these plains, in a direction west by south of Assuan, Dr. John Ball, who headed the reconnaissance and has written the pamphlet, reached cretaceous rocks and the typical low, flat-topped hills of the cretaceous region, after a journey of some 20 miles. He had previously used points of the triangulation in the survey of the First Cataract, from which Jebel Garra was visible, to locate the position of that hill, and he furnishes the results of his observations here, and of those on which they were grounded. Jebel Garra is situated about halfway between Assuan and Kurkur oasis, and Dr. Ball's route-survey was made with the plane-table and measuring-wheel, checked by his triangulation points. Whereas in most previous desert explorations the Egyptian Geological Survey has had to rely on the barometer for the determination of levels, in this case Dr. Ball was able to fix the levels of main points trigonometrically. The height of the highest point of Jebel Garra and of the azimuth station on a hill near Kurkur were also trigonometrically determined. After a short general description of the topography of the Assuan region, the author passes to a more detailed description of the route. The scenery at and about Jebel Garra is striking in the extreme. The limestone is faced and split in every direction; the path of the ascent follows fissures of great depth, but only a few yards wide, and the whole mass is described as apparently "tumbling to pieces," while the effects of the erosion of wind-borne sand afford a wonderful illustration of this destructive force. The wide view from the summit over the Libyan desert is also notable. The route as it approaches the oasis is less well marked than it has been previously over the plain. The first view of the oasis is described as most pleasing after the tedium of the desert track, a statement borne out by some admirable photographic reproductions, the views contrasting very strikingly with the hard bareness of Jebel Garra, detailed plates of which are also given. There are two shallow pools or "wells" in the oasis, upon which a number of desert tracks converge; the water-supply appears to be constant, as the demands of Dr. Ball's party were immediately replaced. The oasis, however, is not inhabited, nor is it of sufficient extent

to maintain any permanent settlement. The observations of Dr. Ball's reconnaissance, while mainly geological, include very full data in other departments; indeed, it is remarkable how much was achieved in a bare week's work. Thus the temperature of the water at the oasis is given as 15° C. (59° F.) when the air was 16½° C. (61·7° F.). A few meteorological observations are given, and Dr. Ball was favoured with a very heavy thunderstorm accompanied by striking phenomena, and has also remarks to offer on the mirage. The geology, both of the region generally and of the route traversed, is discussed at length, as also the origin of the water-supply of the oasis, which the author leaves an open question, inclining to the view that it is derived solely from rain-water. Besides the beautiful reproduction of photographs, the pamphlet is illustrated by large maps of the route and the region concerned, and of Kurkur itself, the reproduction of which is an admirable illustration of the efficiency of the Egyptian Survey Department.

The Sudan-Abyssinian Frontier.—The opposite sketch-map shows the line taken by this frontier, as defined by the agreement of May 15, 1902, the text of which was not made public till December last. It will be seen that the boundary thus fixed is the western frontier of Abyssinia only, that on the south being still undetermined. By this agreement Abyssinia obtains access to the Pibor-Sobat, from the mouth of the Akobo to that of the Baro, although the extreme claims made by Menelik in this direction have not been conceded. Further north, between the Baro and Blue Nile, the new frontier runs for the most part well to the west of the 35th meridian, taken as the dividing line between the British and Italian spheres in the agreement of 1891, though the Blue Nile itself is struck close to that meridian, some 15 miles above Fort Famaka in the Fazokli district. North of the Blue Nile the line does not diverge very materially from the old frontier of the Egyptian Sudan as shown on most maps previous to the Mahdist revolt, though this was never laid down with any precision. But here too, in places, the alteration is to the benefit of Abyssinia. In the south the frontier is formed by the course of the Akobo as far as Melile on that river, and thence runs in a straight line to the intersection of 6° N. with 35° E. Among the other provisions of the treaty, the Emperor Menelik engages not to construct, or allow to be constructed, any work across the Blue Nile, Lake Tsana, or the Sobat, which would arrest the flow of their waters into the Nile, except in agreement with His Britannic Majesty's Government and the Government of the Sudan; to lease to those governments, as a commercial station, a block of territory near Itang, on the Baro, having a river frontage of not more than 2000 metres, and an area not exceeding 400 hectares; and to allow the construction, through Abyssinian territory, of a railway to connect the Sudan with Uganda. For a better understanding of the nature of the country through which the new frontier runs, we may refer to the papers and maps by Majors Austin and Gwynn in the *Journal* for May and December, 1901, and June, 1902. An annex to the treaty also defines the mutual frontiers, north and east of Khor um Hagar on the Setit, of the Sudan and Eritrea on the one hand, and Eritrea and Abyssinia on the other, the result being somewhat to modify previous arrangements. Thus the wedge of territory, running south-west to the Atbara, which was assigned to Eritrea by the preliminary settlement of April, 1901, is now cut off, while, on the other hand, Eritrea gains somewhat at the expense of Abyssinia between Khor um Hagar and the Mareb. These frontiers are not shown on the official map on which our sketch is based.

Hydrography of the Bahr-el-Ghazal Region.—An instructive sketch of the hydrographical system of the Bahr-el-Ghazal and its affluents has been given in the *Annales de Géographie* (vol. xi., 1902, pp. 315–338, and reprint) by Lieut.


Map showing the
SUDAN-ABYSSINIAN
BOUNDARY
Scale of Miles
0 50 100
Nat. scale 1: 5,000,000 or 79 miles-1inch
Boundary
Son
R. Setit
Gedaref
R. Atbara
J. Belula
Gallabat
J. Halawa
R. Rahad
J. Amdug
J. Amidla
R. Dinder
Dunkur
Roseires
J. Abu Ramla
R. el Azrek
GUBBA
Fazogli
J. Gubba
FAZOGLI
J. Kashangaras
KEILI
R. Tumat
Blue Nile or Abai
J. Kurmuk
BENI
SHANGUL
J.
KIRIN - Taza
Kirin
K. Yabus
R. Dobbie
AMAM
R. Sonka
J.
Tulu Wallel
Nasser
Abajala
R. Sobat
R. Baro or Kir
R. Jokau or Garre
Burbur
Buro
Itang
R. Pibor
R. Gelo
L. Tota
R. Akobo
Melile
R. Juba
SUDAN
ABYSSINIA
33
34
35
36
37
6
7
8
9
10
11
12
13
14

A. H. Dyé, one of the members of the Marchand Expedition, whose astronomical determinations of positions during that expedition have already been referred to in the *Journal* (vol. xix. p. 505). The broad features of the system have, of course, been long known, but the bewildering character of the swamps which occupy its lower portion has made it particularly difficult to lay down the courses of the streams, and it was only the necessity for a thorough survey for their navigation by the steam-launch *Faidherbe* that led to the more thorough elucidation of the system, at the cost of infinite labour, by the Marchand Mission. After describing the ferruginous laterite plateau which occupies the whole southern part of the Bahr-el-Ghazal province as well as adjoining parts on the Congo basin, Lieut. Dyé sketches the transition from this region, in which the streams flow in steep-sided valleys, to the sea of swamps which lies along the ninth parallel. It is in about 7° 20′ N. that the first change occurs, the river-banks opening out and leaving between them an alluvial flood-plain, grassy and intersected by swamps, through which the river winds in a tortuous course, much choked by sandbanks. At the height of the rains this is entirely flooded. Still lower the rocky valley-sides entirely disappear, and the clayey banks sink below the mean water-level, the rivers becoming more and more narrow, and diminishing in depth until they are finally lost, each in its own belt of swamp, which forms a sea of grass, *um suf*, and papyrus. The course of the Swe, the largest tributary of the Bahr-el-Ghazal, through the western extremity of these swamps was laid down with much exactness, but in the case of other streams, the Bahr-el-Homr, Bahr-el-Arab, Tonj, and Rohl, Lieut. Dyé is able only to indicate the general lie of the swamps which mask their lower course. The Bahr-el-Ghazal itself, from Meshra-er-Rek downwards, was carefully surveyed, and many indications were found of the changes which have taken place since the days of its early explorers, though M. Dyé considers the sketch given by Lejean in 1862 as wonderfully correct in its general outlines. He divides the drainage channel (for such, rather than a true river, is the character of the Bahr-el-Ghazal) into three sections, each with its particular characteristics, flowing respectively north, north-east, and east. The first is at times of a great width, as at the expansion known as Lake Ambaja, or Ambatch lake (wrongly Ambady on some English maps). There is much floating vegetation, and the channels frequently change with the winds. The depth is nowhere greater than 13 feet in this section, which is characterized as the region of lakes, lagoons, and reed-beds. In the second section, characterized by the growth of papyrus, the channel becomes much narrower, and reaches depths of 20 feet and more, though the figures given by the former travellers seem somewhat exaggerated. The width becomes greater again in the last section, the banks of which are, as a rule, marked by anthills covered with brushwood. Schweinfurth was mistaken in saying that the current of the Bahr-el-Ghazal is imperceptible, for, except in expansions and side branches, some movement can always be traced, and in the narrowest section it reaches a speed of 1¼ miles an hour. A remarkable characteristic of the region is the small variation of water-level between the seasons, owing to the impounding of the water in the marshes. The maximum flood-level occurs on the Bahr-el-Ghazal in November and December, or two months later than on the Swe, and various facts are quoted showing the slight effect which a rise on the upper courses of the streams has on the water-level of the swamp region.

Reorganization of French West Africa.—A change in the organization of French West Africa has once more been brought about by the decree of October 1 last. With a view to the consolidation of the territories under the supreme jurisdiction of a single functionary, the office of governor-general has been

separated from that of governor of the Senegal colony, this, like the other Colonies of French Guinea, the Ivory Coast and Dahome, being now placed under a lieut.-governor, so that the governor-general can now devote his whole attention to the furtherance of the wider interests of the territories. At the same time, his head-quarters are removed from Saint Louis to Dakar, to still further emphasize his independence of the purely local affairs. Another important change has been introduced into the territorial subdivision of French West Africa, the districts on the upper Senegal and Niger which were detached from the French Sudan by the decree of October, 1899, being once more united with the "military territories" of the middle Niger and southern Sahara into an administrative entity to be called the "Territories of Senegambia and the Niger." These territories will in future be administered by special functionaries, under the supervision of the governor-general.

AMERICA.

Mr. Hanbury's Expedition in Northern Canada.—We referred, in the *Journal* for December last (p. 655) to Mr. David Hanbury's latest expedition to the arctic regions of Canada, giving some account of his preparations during the winter spent on the coast of Hudson bay for his advance to the north during the early part of 1902. Mr. Hanbury has since returned from a successful journey, during which he carried out the main items of the programme he had sketched beforehand. A portion of his route was across entirely unexplored country, but, as Mr. Hanbury remarks in a note describing his journey, there are so few marked geographical features in the barren North Land of Canada that his map will merely show a dotted line following up a small river across lakes and over the divide, and then descending a similar river to the Arctic ocean. From Te-be-elik lake the route, which was surveyed by sextant and prismatic compass, led across to near Pelly lake on Back's river and thence to the Arctic coast a little to the east of Ogden bay. Following this coast westwards, Mr. Hanbury found that the previous survey had been very correct. In traversing Kent peninsula he found that this was almost an island, being nearly cut off by a long inlet from Warrender bay, which had not been seen by the surveyors of Melville sound, as the entrance is very narrow. A fresh-water lake 3 miles long almost completes the waterway. Ascending the Coppermine about 80 miles, the party struck west across the divide separating that river from Great Bear lake. Failure of food-supplies made it necessary to hurry, and, the route being also not easy, an accurate survey was here impossible. There is one portage of 8 miles, and many shorter ones. The Dismal lakes of some maps are really only one piece of water, the whole length of which Mr. Hanbury traversed. Besides the route-survey, he took constant observations for latitude, and brought home entomological, botanical, and geological collections, which will be worked up by specialists.

The Leeward Islands.—The census for the Leeward islands was taken throughout the colony on March 31, 1901, and is now given in the recent Colonial Office report. The total population was 127,434, and was distributed as follows: Antigua, including Barbuda and Redonda, 34,971; St. Kitts-Nevis, with Anguilla, 46,446; Dominica, 28,894; Montserrat, 12,215; and the Virgin islands, 4908. The only islands in which a decrease of population occurs are Antigua, St. Kitts, and Nevis, all of which have sugar as their main export. These had their population reduced by 1941, 1094, and 313 respectively; but as the other islands increased, there was a net decrease of only 289 in the total population during the last decade. The large excess of females over males (13,733) may be taken as an indication of the emigration of men who have left the islands in search of

employment elsewhere. The meteorological records show that the last year's rainfall was unusually heavy. Thus in Antigua the total average fall was 57·6 inches, which exceeded the mean of the last twenty years by 11·5 inches. In St. Kitts it was 61·1 as against 38 inches during the previous year, and on November 2 and 3 as much as 22 inches fell in the two days on some of the mountain estates. In Dominica the mean rainfall was 65·71 at the United States station. On the Middleham estate, however, 239·5 inches fell, and at several other stations falls of over 100 inches were recorded.

Abnormal Weather Conditions in Curaçoa.—Judging from the recently published report of the British consul at Curaçoa, the island seems to have experienced considerable variation from the normal meteorological conditions during 1901. Though in the region of steady and constant easterly Trades, the winds blew often and for long periods from unusual quarters. While neither the mean atmospheric pressure (29·81 inches) nor the mean temperature of the air (81·1° Fahr.) varied materially from the average, the rains were very unusually protracted during the latter half of the year, exceeding all previous records. The total rainfall for the year was 25·13 inches against an average of about 16 inches, and in consequence the island showed an unusual verdure, and was provided with abundant fruits and vegetables throughout what is ordinarily the dry season. Thunderstorms were of frequent occurrence, numbering thirty-four, or nearly six times as many as those of the two preceding years combined. The variable winds alluded to prevailed from August to December, and were in every case accompanied by close and sultry weather. The coldest month was January, with an average of 78·6° Fahr., and the warmest September, with 83°·0.

POLAR REGIONS.

Baron Toll's Expedition.—News of this expedition received in Europe during last autumn is recorded in Nos. 10 and 11 of *Petermanns Mitteilungen* for last year. During the spring of 1902 the leader had left the ship with the astronomer Seeberg, in order to make his way to the little-known Bennett Land, the zoologist Birula having already set out for New Siberia island. The *Zarya* sailed on July 1, but, owing to unfavourable ice-conditions, was unable to reach either of these islands, so that the explorers could not be brought off before the winter set in. The *Zarya* took up winter quarters at the mouth of the Lena, and it was proposed to despatch a sledge expedition for the rescue of Baron Toll and his associates during January. There seems no special cause for anxiety on their behalf, as Baron Toll had, before setting out, had in view the possibility that he might be forced to winter on Bennett Land.

Captain Warneck in the Arctic Ocean.—In a pamphlet published by order of the Russian Admiralty, Captain Warneck gives an account of the voyage of the *Pakhtusof* in 1901. The sea was crossed two or three times between Novaya Zemlya and the mainland. On July 25, after a delay of a day or two owing to the ice, the western mouth of the Matochkin Shar was reached, and on August 20 the channel was found to be unusually free of ice. The Shar is 220 miles long by 2 to 8 miles broad, and winds among cliffs sometimes rising precipitously to 5000 feet, while behind rise summits of undetermined height, and glaciers descend to the water. On the Kara coast the water was open and ice had not been seen, according to information received by Captain Warneck, since the beginning of May. The vessel was therefore able to proceed northwards to the Medvezhi (Bear) gulf, in 74° 8′ N. lat., which is 120 miles long. It was entered in 1897 by Mr. H. J. Pearson in the yacht *Laura* (see Colonel Feilden's paper in vol. xi. p. 363), and had been recently visited by the artist Borisof and his assistant, T. E. Timofeyef, who

named the glacier at its head the Witte glacier. The Witte ends in a huge wall more than 3 miles broad and rising 57 feet above the water, and not far from it a depth of 36 fathoms was sounded, so that the thickness of the ice at the extremity is about 273 feet. Bergs were calved with great frequency, and one of them, aground in 510 feet of water, rose 39 feet above the surface. On August 9 the *Pakhtusof* was stopped by ice as it was steaming eastward along the Russian coast at a distance of 60 miles from Medinski point. This experience is important relatively to the project that has been put forth for a port on the Khaipudirska bay, and a railway thence to the Ob. In another pamphlet, reprinted from the *Izvestiya*, vol. xxxviii. No. 3, Captain Warneck deals with the distribution of ice in these seas with especial reference to navigation. The sea is open earlier to the north than the south of Kolguyef island. The Kara strait was open on August 2, and on August 27 the Matochkin Shar was clear throughout its whole length; while the Yugor strait was closed till September 2, and its navigability is very dependent on meteorological conditions. In view of the difficulties often encountered in the straits, Captain Warneck considers that the route round the north of Novaya Zemlya is worth a trial. At the end of August, the pack-ice recedes from the north coast of Novaya Zemlya, leaving the sea open up to lat. about 80°. To ascertain the conditions in the Kara sea, a vessel of the ice-breaker type should round the north of Novaya Zemlya, cross to Cape Mate-Sale, return by the Matochkin Shar to the Arctic, re-enter the Kara sea by the Kara strait, and, having attained the coast of Yalmal near the Sharanof islets, cross once more to the Yugor strait.

The Spitsbergen Degree Measurement.—The Swedish Expedition which went last summer to Spitsbergen to complete the operations for the measurement of an arc of the meridian, left unfinished the preceding year owing to unfavourable weather conditions, returned during the autumn after successfully accomplishing its task, a junction being effected with the Russian net of triangles in the more southern parts of the group. The operations were begun in 1898, and had, therefore, occupied in all no less than five summers.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

The Figure of the Earth.—A mathematical paper, of first importance to geodesists, on "The Vibrations and Stability of a Gravitating Planet," by Mr. J. H. Jeans, Fellow of Trinity College, Cambridge, was communicated to the meeting of the Royal Society on December 4, by Prof. G. H. Darwin. An abstract appears in the new number of the *Proceedings*. It is pointed out that "in the classical investigation of the displacements produced in a gravitating sphere by given surface forces, the most important of the gravitational terms is omitted. The effect of this omission is to necessitate a correction, and this may entirely invalidate the solution when we are dealing with spheres the size of the Earth or other planets. In fact, it appears that for a gravitating solid of the kind we are discussing, the spherical configuration may be one of *unstable equilibrium*." Applying the conclusions arrived at to questions connected with the figure of the Earth, Mr. Jean says, "It seems to be almost certain that the present elastic constants of the Earth are such that a state of spherical symmetry would be one of stable equilibrium. On the other hand, if we look backwards through the history of our planet, we probably come to a time when the rigidity was so small that the stable configuration of equilibrium would be unsymmetrical. At this time the Earth would be pear-shaped, and the transition to the present spherical form would take place through a series of ruptures. It is suggested that the Earth, in spite of this series of ruptures, still retains traces of a pear-shaped configuration. Such a

configuration would possess a single axis of symmetry, and this, it is suggested, is an axis which meets the Earth's surface somewhere in the neighbourhood of England (or possibly some hundreds of miles to the south-west of England). Starting from England, we find that England is at the centre of a hemisphere which is practically all land; this would be the blunt end of our pear. Bounding the hemisphere we have a great circle, of which England is the pole, and it is over this circle that earthquakes and volcanoes are of most frequent occurrence. Now, if we suppose our pear contracting to a spherical shape, we notice that it would probably be in the neighbourhood of its equator that the changes in curvature and the relative displacements would be greatest, and hence we should expect to find earthquakes and volcanoes in greatest numbers near to this circle. Passing still further from England, we come to a great region of deep seas—the Pacific, South Atlantic, and Indian oceans; these may mark the place where the 'waist' of the pear occurred. Lastly, we come, almost at the antipodes of England, to the Australian continent; this may mark the remains of the stalk end of the pear." Although Mr. Jean's description of the distribution of land and sea, and of regions of seismic and volcanic disturbance, may be open to some criticism by geographers and geologists, it need not seriously affect his general results, which throw a new light on an extremely obscure problem.

Rate of Torrential Erosion.—Prof. Chaix, of Geneva, suggests that the well-marked and different characteristics of torrential and glacial erosion may be traced in many Alpine valleys, and the limit between them determined. He has examined the valley of the Drance de Bagnes, which flows into the Rhône at Martigny, from this point of view, and finds that torrential erosion accounts for only some 6 to 22 metres of excavation since glacial activity ceased. He concludes that we overestimate the rate of torrential erosion, and that the immense volume of matter worn away in pre-glacial valleys must have taken much longer than is generally supposed. This is an important argument in favour of the glacial theory of hanging valleys of Penck and others. May not the facts be also interpreted as an indication of the shortness of the period of post-glacial erosion?

The Atlantis Problem.—Dr. Scharff read a paper at the Zoological Section of the British Association at Belfast, in which he stated the results of his studies of the fauna of the eastern Atlantic islands. He considers that Madeira and the Azores are the remains of an ancient Tertiary land, attached to Europe, and probably severed from it in Miocene times, again united, and not finally disconnected until the Pleistocene period. Any land bridge across the Atlantic must have been farther south, uniting North Africa with Brazil and Guiana in early Tertiary times, and probably disappearing beneath the waves, except for a few peaks, in the Miocene period.

Limiting Width of Meander Belts.—Prof. Mark Jefferson has been investigating the width of the belt containing meanders of a river, and finds it bears a fairly constant ratio to the width of the stream itself. To measure the width of the meander belt, the maximum distance between lines tangential to the outer swings of the river is determined. It is found that streams rarely attain their maximum meanders until the belt is two or three times as wide as the successive loops are distant along the general course of the river; and, further, that the meander belt is about eighteen times the width of the stream itself, as long as it flows across a flood-plain, but that the ratio increases greatly (to over thirty in the cases examined by Prof. Jefferson) where the meanders are incised. On the Dniester the ratios of 14·3 and 16·4 were obtained where it flowed over a flood-plain, but they rose to 34 and 36 where the meanders were incised in higher ground. The average difference of the flood-plain ratios is only 3·3 from the mean,

whereas in the case of incised meanders it is 12·3. The cut-offs which regulate the width on the plain cannot readily occur where the stream-bed is cut in the rocks (*National Geographic Magazine*, October, 1902).

A Cause of River-curves.—Dr. Callaway points out, in the *Geological Magazine* for October, 1902, that most tributaries enter meandering rivers on the convex side of their curves. This he explains as due to the component movement of the united waters of main stream and tributary being directed towards the bank opposite the mouth of the tributary, but a little lower down, and there "the lateral force will be balanced by the resistance of the bank, and the carrying power of the current will be reduced. . . . The growth of this new land will cause a deflection of the current, which will impinge upon the opposite bank lower down, and will begin to excavate." Above the new land the main stream will be barred, and in the slack water sediment will be thrown down. The problem is one of the many related to the morphology of riverine forms which demand immediate investigation, and might most profitably be studied in the field during our vacations.

Soundings in the Atlantic.—The November number of the *Annalen der Hydrographie* contains two valuable papers on new soundings in the Atlantic ocean. Captain A. Simonsen, of the Hamburg and South American Co.'s ss. *Tijuca*, reports on soundings off the east coast of South America, some of which show considerable differences from those given on the charts. The charts give in most cases depths not exceeding 50 fathoms, while a number of Captain Simonsen's soundings in the same area did not touch bottom at over 100 fathoms. Most of the discrepancies occur between 20° 50′ and 21° 30′ S. lat., and 40° to 40° 20′ W. long. The other and longer list reports on the sounding expedition of the cable ship *von Podbielski* in the summer of 1902. Three hundred and eighteen new soundings are given, along three lines: (1) mouth of the English channel to the Azores; (2) Azores to New York; (3) New York to Azores. Special care was taken, by the use of Rendle's sounding-tube and the Lucas "snapper," to obtain good samples of the bottom, and observations of surface and bottom temperature were made, the latter with a "Reynolds" deep-sea thermometer, concerning the construction of which the Deutsche Seewarte asks for information.

List of Soundings.—We have received the Admiralty list of soundings and temperature observations received from H.M. surveying ships, Indian Marine Survey, and British Submarine Telegraph Companies during 1901. The list includes eleven series, two in the South Indian ocean, one in the North Indian ocean, one in the Red sea, one in the North Atlantic, three in the South Atlantic, one in the North Pacific, and two in the South Pacific.

Natural History Collecting.—We draw the attention of intending travellers to the excellent little handbook of instructions for collectors lately issued by the Natural History Museum at South Kensington. It gives in a clear and concise form hints on the collection and preservation of specimens, both of the various subdivisions of the animal kingdom, and of plants, fossils, and minerals. Each section (which may also be had separately) has been prepared by a member of the staff of the Natural History Museum, which, it is hoped, may in course of time benefit in one way or another by the collections of those who use it. While intended primarily for the use of voluntary collectors, it is equally suitable for use by more professional naturalists. While most of the sections have been specially written for the purpose, Mr. G. Murray reprints, with few additions, the directions for collecting and preserving plants drawn up by Robert Brown, considering that any fresh directions "could only fail to equal these in conciseness and lucidity." It may be observed, however, that some of the directions do not tally with those of

other guides, and show that doctors may disagree on these as on other subjects. Thus, the tin collecting-boxes, pressing-boards, and straps, which are so strongly condemned in the instructions issued by the authorities of the Calcutta Herbarium, all find a place in the recommendations with regard to outfit. The different conditions in tropical and temperate regions no doubt account for the discrepancy. As a whole, the instructions are a decided advance on any yet issued, and their comprehensiveness is shown by the fact that, as regards the animal kingdom, they deal with every grade of life from tigers to mosquitos.

OBITUARY.

Sir Arthur Hodgson.

We regret to announce the death of Sir Arthur Hodgson, K.C.M.G., a Fellow of the Society of old standing, and an ex-member of the Council. Sir Arthur was the son of the Rev. Edward Hodgson. He was born in 1818, and was educated at Eton and Corpus Christi College, Cambridge. After serving as a midshipman in the navy for three years, he determined, at the age of twenty-two, to try his fortune in the colonies, and settled down at Darling Downs, in the Moreton Bay settlement, which then formed part of New South Wales. Here he speedily became one of the leading colonists. He was made a member of the Legislative Assembly of the colony, and played an active part in public affairs. In 1856 he was appointed general superintendent of the Australian Agricultural Company. Three years later the settlement was separated from New South Wales, and the colony of Queensland came into existence. Mr. Hodgson was quite out of sympathy with the movements which were so rapidly changing the old order of things in Australia, and had strenuously opposed the separation. But once the change had been effected, he threw himself vigorously into the public life of the new colony. For some years he represented Warrego in the Legislative Assembly. In 1862 he acted as commissioner for Queensland at the great International Exhibition in London, and in 1867 filled the same post at the Paris Exhibition. A year later he became Secretary of Public Works for the colony, while the year after that saw him Colonial Secretary. Five years later he came home and settled down at Clopton House, Stratford-on-Avon. He devoted much time and attention to the affairs of that ancient borough and of the county of Warwick, both of which he served in many distinguished capacities. He still retained, however, his interest in the affairs of Queensland. In 1874, the year of his return, he represented the colony at the Vienna Exhibition. When, four years later, he occupied a similar position at the Paris Exhibition, occasion was taken to confer upon him the Companionship of the Order of St. Michael and St. George. His promotion to be a Knight Commander followed in 1886, when he was a Royal Commissioner for the Colonial and Indian Exhibition, and general secretary for the reception committee. Sir Arthur Hodgson became a Fellow of the Society in 1856, and served on the Council in 1892–93. His death, at the advanced age of eighty-four years, occurred on Christmas Eve.

James Cornwell, Ph.D.

By the death of Dr. Cornwell, which took place on December 12, the Society loses a Fellow who in his day did much to improve geographical education in the primary and secondary schools in this country. Dr. Cornwell had reached the

advanced age of ninety years, and his name is not now so familiar in the educational world as it was about the middle of last century. With the multiplication of modern text-books, his manuals, which embraced a variety of school subjects, have lost much of their popularity; but they may justly be said to have served a useful purpose, at a time when the methods of teaching in vogue in public schools admitted of still greater reform than at the present day, and that they were appreciated by those for whom they were intended is testified by the extraordinary success they enjoyed. Dr. Cornwell was himself a teacher, and possessed great natural qualifications for his calling. He had the born teacher's happy knack of imparting his knowledge to others, his views on education were broad, and he has just claim to be regarded as one of those who heralded in the age of modern reform in this department of national life. In 1846 his abilities were recognized by his being appointed the first principal of the reconstituted Borough Road Training College, Isleworth, then newly placed under Government control, and now the leading training college for primary teachers in this country. Here he rendered valuable service to the cause of elementary education for ten years, at the end of which period he retired, and devoted himself entirely to the writing and constant revision of educational text-books. In the geographical field his labours resulted in the production of a 'School Geography,' a 'Geography for Beginners,' and a 'School Atlas.' Of these the first is the best known; it was very popular in secondary schools, and ran into ninety editions. Dr. Cornwell became a Fellow of the Society in 1860.

Julien Adrien Hilaire Louis.

We regret to announce the sudden death, on December 15, of Mr. Julien Adrien Hilaire Louis, a Fellow of this Society and a barrister of the Middle Temple. Mr. Louis, who was in his sixty-fourth year, was born in Lyons on March 6, 1839. He was, notwithstanding the French name, the son of a Polish officer of the period of the "Emigration." The greater part of his life was spent in India, where he resided almost continuously from 1856 to 1895. He served as a volunteer during the Mutiny in 1857. Later, in 1865, he received the formal thanks of the Government of Bengal for the measures he adopted for the relief of a local famine—measures which resulted in the saving of many lives. A pamphlet which he wrote upon the condition and prospects of Serici culture in Bengal suggested the steps which were afterwards taken by the Government for the revival of the silk industry in India. His interest in the ancient literature of the country was evidenced in his membership of the Buddhist Text Society of India. He was also the author of a work entitled 'The Gates of Thibet,' which was the fruit of travel in Independent Sikkhim, British Bhootan, and the Dooars.

CORRESPONDENCE.

Captain Dickson's Map of the Kenya and Kitui Districts.

THE age of geographical pioneering being almost past, has not the time come for a more critical use of hill-shading, especially in original maps issued by geographical societies? The question is suggested by the map of part of the Kenya and Kitui districts from a plane-table sketch by Captain B. Dickson, which was published in the January number of the *Geographical Journal*.

On my journey to Mount Kenya, in 1899, I traversed all the western portion of the region depicted, and can therefore speak with regard to it from personal knowledge. I should have been quite prepared to find that my observations for distance and direction needed some amendment when compared with a district survey, for mine was a mere route survey, disturbed at certain points by bad weather and hostile natives. I was surprised, however, to obtain in the hill-shading of Captain Dickson's map only a very confused image of the salient features of the district, which are, in reality, beautifully simple and markedly contrasted.

To commence with a small point in the south, I note that the Nairobi has a continuous valley indicated both above and below its falls. Now, I can prove by photographs taken by my colleague Mr. Hausberg, that immediately above the falls the Nairobi is practically flush with the plain, and that it tumbles over a precipice into the head of a gorge. Moreover, a few miles to west there is a well-marked escarpment facing eastward, which is breached by the Nairobi emerging from an upper gorge. None of these features, which are essential to the understanding of the country, are indicated, and, on the contrary, that which does not exist is suggested.

Further northward the shading pre-supposes the existence of a high ridge, some 15 miles in length, to which the names of Kamahua and Boinzero are applied. This ridge has a great abrupt descent eastward towards the Tana, but, as it is shown, it should also have a very considerable and almost precipitous fall towards the plateau extending from it westward. In other words, it should, even from the west, be a feature of the landscape almost as important as Donye Sabuk. This is very far from being the case. Whether seen from the plains west of Donye Sabuk, or down the valleys which come from Meruka (Muluka), or from the hill of Kandundu in the north, whose position is indicated by the figures "4000" to the right of the word "Mbirri," it has the appearance of a mere rise on the edge of the tableland. I notice that in Captain Dickson's map it is marked with the height of 5160 feet. The plateau to west of it cannot be many hundred feet lower. I base this statement on a line of rough observations which I took on the spot. The elevation of the gap between the mountains Kanjuyu and Kanbicho is given by Captain Dickson at 3800 feet, and was estimated by me at 3900, and I have, therefore, confidence in the general truth of my measurements.

But the shading becomes still more disappointing a little further to northward. The view from Kandundu in every direction except the north-west is a striking one. To south-west is a plateau which is lower than the tableland between Boinzero and Meruka rising behind it. This lower plateau is ridged repeatedly from west to east, owing to the relatively advanced denudation of the lava-sheet. Eastward it ends suddenly in an escarpment which, starting from Kandundu, runs southward and then south-eastward in the direction of the peaked Ithanga hills. This escarpment is repeatedly breached by the tributaries of the Tana emerging from the valleys of the plateau. There are some small foothills (quite subordinate, however, to the escarpment itself), and from these the plain extends eastward to the Tana and beyond to the horizon. The only features of the wide expanse seen from Kandundu eastward are some distant insular hills and the long belts of trees which indicate the courses of the Tana, the Marathwa (Mathioya), and the Maragua. In the map under discussion I find no intelligible suggestion of the great contrasts of this landscape.

Turning now to the northward view from Kandundu, I again find confused detail where the features are, in fact, clear and emphatic. Kanbicho (Kambijo) and Kanjuyu (Kamuti) are two isolated gneissic hills rising from 700 to 900 feet

above the plains. Their long axes are directed in a south-easterly direction parallel to one another. The gap between them is cut right down to the level of the Meranga plain, and the Tana, already a much more important stream than is suggested by the map, flows in a shallow trench past the northern foot of both hills. The Marathwa flows past their southern foot at a level about 150 feet lower than the Meranga plain. There is a second gap to westward of Kanjuyu. So marked is the isolation of these two hills, Kanbicho and Kanjuyu, that they constitute a very striking landmark when seen from the distant shoulders of Mount Kenya.

Northward of the Tana spreads the plain of Meranga, traversed only by some low rises. Immediately north of Kanjuyu is shown in the map the confluence of the Tana and its tributary, the Ragati. They meet in a hippopotamus pool, into which they fall over lava cliffs. Above these falls they are flowing almost flush with the plain, and yet the hill-shading suggests gorges of an importance equivalent to that of the Athi. The result is entirely to break the effect of the *plain* of Meranga.

Finally, I observe the inscription curving round Meranga from north-west to north-east—"Hills gradually rising towards Kenya." Now, Kenya lies to northward and north-eastward, and the ascent north-westward is to the plateau of Laikipia, whose level edge is a conspicuous feature as seen from the northern foot of Kanbicho. The plain of Meranga ends some 7 or 8 miles north-westward of Kanbicho at the foot of a definite and considerable escarpment, which curves northward and north-eastward from the neighbourhood of Katuri. This escarpment is cleft at two points by the Sagana and Ragati, whose valleys trench the plateau of which the escarpment is the edge. Some distance behind commences the final ascent to Laikipia. All these facts are patent from Kanbicho.

I do not wish in any way to blame Captain Dickson. His short article indicates that he has appreciated far more of the essential contrasts than are shown upon his map. It is quite likely that the chief fault lies with the draughtsman. The practice of filling in the outlines of a survey with hill-shading—"according to taste," as the cookery books say—is only too frequent. The result in the present case has been to produce a map misleading for the traveller because its parts are disproportionate and ungrouped, and puzzling to the teacher and scientific geographer because its crowded details are to a large extent meaningless. Is it too much to expect that geographical surveyers and map-makers should have mastered at least the outlines of the science of land-forms? The artist who depicts the human form finds it necessary to know so much of anatomy as is needed to explain the contours of the body.

H. J. Mackinder.

[Captain Dickson's map is the result of a plane-table survey; he was not able to survey in equal detail all parts of the region covered by the map. He submitted to the Society a blue-print copy of his original drawing. The map published by the Society is simply a copy of the blue print on a smaller scale; the drawing was supervised and a proof was carefully revised by Captain Dickson, certain alterations in the course of rivers being adopted by him at the suggestion of Mr. S. L. Hinde. The intention of hill-shading and the necessity for discrimination in its use are quite realized in the map-drawing department of the Society; but in the case of Captain Dickson's map the draughtsman was simply a copyist. Of Captain Dickson's competency as a surveyor there can be no question, nor indeed of his skill as a cartographer. He served with Colonel Sir Thomas Holdich on the staff of the survey expedition last year in connection with the Argentine-

Chile Boundary Arbitration; and he again accompanies Sir Thomas Holdich this year to lay down the boundary decided upon. Captain Dickson will therefore be unable to reply to Mr. Mackinder's strictures for some time.—Ed. *G.J.*]

The Crozets.

In connection with Prof. von Drygalski's narrative of the voyage of the *Gauss* from Cape Town to Kerguelen (*Geographical Journal, ante*, pp. 39–42), it may be of interest to repeat here some of the facts known concerning the flora of the Crozets, especially as he was under the impression that "no human foot had ever before trod this solitary strand."

Although the *Challenger* Expedition equally with Sir James Ross's failed to effect a landing on this group, I brought together all that I could find relating to the vegetation in the 'Botany of the Challenger Expedition' (i. part 2, pp. 207–210), in order to compare it with that of Prince Edward, Kerguelen, and Macdonald groups. Eight species of plants were then known to inhabit Possession island, six of which were collected by the officers of the United States ship *Monangahela*, and two by Captain J. N. East, of H.M.S. *Comus*, who examined the Crozets in 1880 in order to ascertain if any shipwrecked persons were there. The eight plants are—*Pringlea antiscorbutica* (Cruciferæ); *Acæna adscendens* (Rosaceæ); *Azorella Selago* (Umbelliferæ); *Galium antarcticum* (Rubiaceæ); *Cotula plumosa* (Compositæ); *Lomaria alpina* and *Asplenium obtusatum* (Filices); and *Andræa marginata?* a moss. These plants are all widely spread in the highest southern latitudes of phanerogamic vegetation, extending both to the South American and New Zealand outlying islands, or to one or the other of these regions, except *Pringlea antiscorbutica*, which has only been found in Marion, Possession, Kerguelen, and Heard islands.

Captain East reported to the secretary of the Admiralty that the "Kerguelen cabbage" was abundant on Possession island, and also a plant called "red-root," on which, the pilot who had spent some years in the islands assured him, human beings could not only exist, but get fat. Specimens of the two ferns named above, collected by Captain East, are in the Kew Herbarium, where there are also specimens of *Pringlea antiscorbutica* and *Azorella Selago* from Possession island. They were sent alive by Mr. J. M'Gibbon, at that date superintendent of the Botanic Garden, Cape Town, who obtained them through the master of one of the vessels trading to the islands; but as they died on the passage to Kew, they were dried and preserved.

In addition to the eight plants enumerated above, the Americans saw "a small vine with blue flowers," of which, however, they preserved no specimen, and I cannot hazard a guess at what it might be. The sealers in this region informed the officers of the *Challenger* Expedition that rabbits and hogs abounded in the islands, but both were unpalatable because of their food.

W. Botting Hemsley,
Herbarium, Kew.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1902-1903.

Fifth Ordinary Meeting, January 12, 1903.—Sir CLEMENTS MARKHAM, K.C.B., F.R.S., President, in the Chair.

ELECTIONS:—*Hon. Oliver Andrew Borthwick; J. W. Brooke, late 7th Hussars; Ernest Charles Chappell; William Edwards Gray; Arthur Hiorns; Captain E. R. B. Murray, Indian Staff Corps; Charles Partridge, M.A., Assistant-District Commissioner, Southern Nigeria; Lieut.-Colonel George Ripon, Indian Staff Corps; Thomas Alfred May Spargo; Arthur Robert Tudney; Julius Ritter und Edler von Schmaedel.*

The Paper read was:—

"Recent Volcanic Eruptions in the West Indies." By Dr. Tempest Anderson.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce.
C. Rd. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
k. u. k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. = Memoirs, Mémoires.
Met. = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Alps—Orography. *B.S.G. Italiana* **3** (1902): 682-716, 757-779, 833-861. **Marinelli.**
Studi orografici nelle Alpi Orientali. Del Socio Prof. Olinto Marinelli. *With Illustrations.*

Alps—Structure. **Wahner.**
Das Sonnwendgebirge im Unterinnthal. Ein typus Alpinen Gebirgsbaues von Dr. Franz Wahner. Herausgegeben mit Unterstützung der Gesesellschaft zur Förderung Deutscher Wissenschaft, Kunst und Literatur in Böhmen. Erster Theil. Leipzig and Wien: F. Deuticke, 1903 [1902]. Size 12 × 8½, pp. xii. and 356. *Maps and Illustrations. Price* 35*m. Presented by the Publishers.*
To be reviewed.

Austria-Hungary. *Deutsch. Rundschau G.* **25** (1902): 49-60. **Lukas.**
Studien zur Verkehrsgeographie des österr.-ungar. Okkupationsgebietes. Von Dr. Georg A. Lukas.

Austria-Hungary. *Deutsch. Rundschau G.* **25** (1902): 77–80. ———

Der Streit um das Meerauge in der Hohen Tátra. *With Map.*

Cf. note in the *Journal* for December, 1902 (p. 651).

Balkan Peninsula. *La G., B.S.G. Paris* **6** (1902): 309–312. **Hardy.**

La végétation des pays illyriens. Par Marcel Hardy. *Also separate copy, presented by the Author.*

Carpathians and Alps. *C. Rd.* **135** (1902): 872–874. **Lugeon.**

Analogie entre les Carpathes et les Alpes. Note de Maurice Lugeon.

France. *A Travers le Monde, Tour du Monde* **8** (1902): 393–396. **Combes.**

Le Marquenterre.—Un Coin de Sahara en France. Par Paul Combes. *With Map and Illustrations.*

France—Glaciers. **Kilian and Rabot.**

Commission Française des Glaciers. Rapport sur les variations des glaciers français de 1900 à 1901, présenté à la Commission Française des Glaciers, par W. Kilian. Revue de Glaciologie, par Ch. Rabot. (Extrait de l'Annuaire du Club Alpin Français, 28e volume. 1901.) Macon: Protat Frères, 1902. Size 9 × 6, pp. 92. *Map and Illustrations. Presented by the Commission.*

France—West Coast. *B.S.G. Com. Bordeaux* **28** (1902): 348–357. **Bocquier.**

Les Courants marins des côtes poitevines. Par le Prof. Edmond Bocquier. *With Map.*

Germany. **Hellmann.**

Regenkarte der Provinzen Schleswig-Holstein und Hannover sowie von Oldenburg, Braunschweig, Hamburg, Bremen u. Lübeck. Mit erläuterndem Text und Tabellen. In amtlichem Auftrage bearbeitet von Professor Dr. G. Hellmann. Berlin: Dietrich Reimer (Ernst Vohsen), 1902. Size 10½ × 7, pp. 44. *Map.*

Italy. *B.S.G. Italiana* **3** (1902): 780–798, 878–892. **Errera.**

L'incremento del delta della Toce nell' epoca storica. Nota del Socio dott. Carlo Errera. *With Map.*

Italy. *Riv. G. Italiana* **9** (1902): 521–525. **Magistris.**

Contributi geologici e geografici forniti dalla Direzione dei Lavori della Società Italiana per le Strade Ferrate Meridionali (R.A.). Per L. F. de Magistris.

Italy. **Orsi.**

Das moderne Italien. Geschichte der letzten 150 Jahre bis zum Ende des neunzehnten Jahrhunderts. Von Pietro Orsi. Uebersetzt von F. Goetz. Leipzig: B. G. Teubner, 1902. Size 8½ × 5½, pp. x. and 380. *Price* 5.60*m. Presented by the Publisher.*

Italy. **Fischer.**

Prof. Teobaldo Fischer. La Penisola Italiana, saggio di corografia scientifica. Prima traduzione italiana sopra un testo intieramente rifuso ed ampliato dall' Autore arricchita di Note ed Aggiunte a cura dell' Ing. V. Novaresse, dott F. M. Pasanisi e Prof. F. Rodizza. Torino: Unione Tipografico-Editrice, 1902. Size 11 × 7½, pp. xvi. and 500. *Maps, Diagrams, and Illustrations. Price lire* 14.40. *Presented by the Publishers.*

This is not a mere translation of the German edition published in 1891, but the subject-matter has been entirely revised and extended to twice its bulk.

North-West Europe. **Chisholm.**

Stanford's Compendium of Geography and Travel. (New Issue.) Europe. Vol. ii. The North West. By Geo. G. Chisholm. London: E. Stanford, 1902. Size 8 × 5, pp. xxviii. and 742. *Maps and Illustrations. Price* 15*s. Presented by the Publishers.*

Norway—Pilot. ———

Supplement, 1902, relating to the Norway Pilot. Part i. Third Edition (1897). Corrected to June, 1902. London: J. D. Potter, 1902. Size 10 × 6½, pp. 47. *Price* 9*d. Presented by the Hydrographer, Admiralty.*

Rumania—Geographical Dictionary. **Lahovari and others.**

Marele Dicționar Geografic al Romînieĭ . . . de George Ioan Lahovari și General C. I. Brătianu, Grigore G. Tocilescu. Vol. v. Podul-peste-Dunăre — Zvorsca. Bucuresti: J. V. Socecŭ, 1902. Size 13 × 9½, pp. 810.

Russia. *Zemlevedenie* (1902): 148–164. **Grachef.**

On some lakes of the Kostromsk district. By A. Grachef. [In Russian.] *With Illustrations.*

See note in the Monthly Record.

Russia. *Mém. Comité Géolog.* **20** (No. 2) (1902): pp. 146. **Wosnessensky.**

Hydrogeologische Untersuchungen im Kreise Nowomoskowsk, Gouvernement Jekaterinoslaw. Von W. Wosnessensky. [In Russian, *Résumé* in German.] *With Map.*

Russia—Pechora. **Sergeyeff and Novosiltsoff.**

Meteorological Observations made in 1901 at the mouth of the Pechora by the Expedition in the North Glacial Ocean under the command of Captain Sergeyeff and Midshipman Novosiltsoff. [In Russian.] St. Petersburg, 1902. Size 10½ × 7, pp. 100.

Spain. **Williams.**

The Land of the Dons. By Leonard Williams. London: Cassell & Co., Ltd., 1902. Size 10 × 6, pp. xii. and 398. *Portraits and Illustrations. Price* 15*s. net Presented by the Publishers.* [Review, p. 63, *ante.*]

Strait of Dover—Currents. **Wilson and Field.**

Report on Observations of the Tidal Currents and Undercurrents in the Strait of Dover, made with a Deep Sea Current Meter. By Maurice F. J. Wilson and Captain A. Mostyn Field, 1900–1901. London: J. D. Potter, 1902. Size 13 × 8½, pp. 12. *Plan. Price* 1*s. Presented by the Hydrographic Department, Admiralty.*

Sweden—Lapland. *Tour du Monde* **8** (1902): 529–552. **Launay.**

Au pays des Lapons. Laponie suédoise et Nordland Scandinave. Par L. de Launay. *With Map and Illustrations.*

Switzerland—Simplon. *Questions Dipl. et Colon.* **14** (1902): 587–609. **Peyralbe.**

France et Simplon. Par E. Peyralbe. *With Map and Diagram.*

Discusses the benefits to be gained by France from the Simplon tunnel.

Switzerland—Simplon Tunnel. *J.S. Arts* **51** (1902): 23–36. **Goegg.**

Le Tunnel du Simplon, et la Nouvelle Ligne de Chemin de Fer Directe Anglo-Italienne pour l'Orient. Par le Dr. Gustave Goegg. *With Map and Diagram.*

United Kingdom—Climate. *Quarterly J.R. Meteorolog. S.* **28** (1902): 253–281. **Bayard.**

English Climatology, 1891–1900. By F. C. Bayard. *With Map.*

United Kingdom—Geological Survey. ——

Memoirs of the Geological Survey. Summary of Progress of the Geological Survey of the United Kingdom and Museum of Practical Geology for 1901. London: E. Stanford, 1902. Size 10 × 6½, pp. 220. *Price* 1*s.*

United Kingdom—Lake District. **Brabant.**

The English Lakes. By F. G. Brabant. London: Methuen & Co., 1902. Size 6 × 4, pp. x. and 380. *Maps and Illustrations. Price* 4*s. Presented by the Publishers.* [Review, p. 62, *ante.*]

United Kingdom—Lancashire. **Bailey.**

Mem. and P. Manchester Lit. and Philosoph. S. **47** (1902–1903): (No. 2): 1–10.

On the Adventitious Vegetation of the Sandhills of St. Anne's-on-the-Sea, North Lancashire (Vice-County 60). By Charles Bailey. *With Plates.*

United Kingdom—London. **Cook.**

Highways and Byways in London. By Mrs. E. T. Cook. London: Macmillan & Co., Ltd., 1902. Size 8 × 5½, pp. xiv. and 480. *Illustrations. Price* 6*s. Presented by the Publishers.*

An excellent account of London, its life, institutions, and associations, under the most varied aspects. Mr. Hugh Thomson's illustrations, as usual, are inimitable.

United Kingdom—Meteorology. *Quarterly J.R. Meteorolog. S.* **28** (1902): 229–252. **Mill.**

The Cornish Dust-fall of January, 1902. By Dr. H. R. Mill. *With Diagrams.*

United Kingdom—Scotland. **Hinxman and Wilson.**

Memoirs of the Geological Survey. Scotland. The Geology of Lower Strathspey. (Explanation of Sheet 85.) By L. W. Hinxman and J. S. Grant Wilson, with Petrological Chapter and Notes by J. S. Flett, D.Sc., Glasgow. London: E. Stanford, 1902. Size 10 × 6, pp. vi. and 92. *Illustrations. Price* 1*s.* 6*d.*

United Kingdom—Scotland. *Scottish G. Mag.* **18** (1902): 577–587. **Privat-Deschanel.**

The Influence of Geography on the Distribution of the Population of Scotland. By M. Paul Privat-Deschanel. (Translated from the French.)

United Kingdom—Scotland. **Dron.**

The Coal-Fields of Scotland. By Robert W. Dron. London, etc.: Blackie & Son, 1902. Size 9 × 5½, pp. 8 and 368. *Maps and Sections. Presented by the Publishers.*

United Kingdom—Scotland—Hebrides. *Nature* 67 (1902): 84–85. **Wharton.**

Local Magnetic Focus in Hebrides. By Sir W. J. L. Wharton, K.C.B., F.R.S. *With Map.*

United Kingdom—Staffordshire. **Gibson and Wedd.**

Memoirs of the Geological Survey. England and Wales. The Geology of the Country around Stoke-upon-Trent. (Explanation of Sheet 123.) By Walcot Gibson and C. B. Wedd, with Notes by George Barrow. London: E. Stanford, 1902. Size 10 × 6, pp. 88. *Index-map and Sections. Price* 1*s.* 6*d.*

United Kingdom—Wales. **Strahan and Cantrill.**

Memoirs of the Geological Survey. England and Wales. The Geology of the South Wales Coal-field. Part ii. The Country around Cardiff, being an account of the region comprised in Sheet 263 of the Map. By Aubrey Strahan and T. C. Cantrill. London: E. Stanford, 1902. Size 10 × 6, pp. vi. and 148. *Map and Sections. Price* 2*s.* 3*d.*

United Kingdom—Water-Supply. **Beadle and May.**

The Underground Water Preservation Association, on the Underground Water-Supply of the Country. Edited by Clayton Beadle and Wm. May. London: Published by the Association. Size 9½ × 6, pp. 104. *Map. Price* 1*s. Presented by the Association.*

ASIA.

Asia—Cartography. **Diest and Lücken.**

Asien **1** (1902): 69–70, 85–89, 117–119, 152–155, 165–169, 184–186.

Der heutige Stand der Kartographie Asiens. Von Oberst. W. v. Diest und Rittmeister C. v. Lücken. *With Map.*

Asia—Historical. *Asien* **2** (1902): 12–14. **Wirth.**

Alte west-östliche Beziehungen. Von Dr. Albrecht Wirth.

Ceylon. **Ferguson.**

The Ceylon Handbook and Directory and Compendium of Useful Information, to which is prefixed a Statistical Summary for the Colony, and specially for the Planting Enterprise: up to June, 1902. Compiled and edited by J. Ferguson. 1902. Size 8½ × 5½, pp. 1178. *Plans.*

China—Kiauchou. **Maercker.**

Deutsch, Kolonialzeitung **19** (1902): 10, 22, 33, 42, 53, 70, 82, 97, 112, 121, 469, 479, 487, 498.

Die Entwicklung des Kiautschougebiets. Von Maercker. *With Maps and Illustrations.*

China—Mongolia. *Asien* **1** (1902): 149–152, 186–190. **Faupel.**

Peking—Urga. Ein Reisebericht von Faupel. *With Map and Illustrations.*

China and Japan. **Blakeney.**

On the coasts of Cathay and Cipango forty years ago. A Record of Surveying Service in the China, Yellow, and Japan Seas, and on the Seaboard of Korea and Manchuria. By William Blakeney. London: Elliot Stock, 1902. Size 9 × 5½, pp. xx. and 354. *Price* 12*s. net. Maps and Illustrations. Presented by the Publishers.*

Eastern Asia. **Richthofen.**

Chrysanthemum und Drache. Vor und während der Kriegszeit in Ostasien. Skizzen aus Tagebüchen von Freiherrn Wilhelm von Richthofen. Berlin: F. Dümmlers, 1902. Size 9 × 6, pp. viii. 288. *Map and Illustrations. Price* 6*s.*

The author, who is a nephew of Baron von Richthofen, describes journeys in Japan, China, and Formosa, in the course of which he sometimes left the beaten track.

India. **Boeck.**

Durch Indien ins verschlossene Land Nepal. Ethnographische und photographische Studienblätter. Von Dr. Kurt Boeck. Leipzig: F. Hirt & Sohn, 1903. Size 10 × 6½, pp. xv. and 320. *Map and Illustrations. Price* 10*s.*

India. **Connor and Roberts.**

Tide Tables for the Indian Ports for the Year 1903 (also January, 1904). Part i. Western Ports (Suez to Pámban Pass). Part ii. Eastern and Burma Ports (Galle to Port Blair). By Edwin Joscelyn Connor and E. Roberts. Size 6½ × 4, pp. 1204. *Price 2 rupees each Part. Presented by the Secretary of State for India.*

India. *Quarterly J.R. Meteorolog. S.* **28** (1902): 283–279. **Dallas.**

Earth Temperature Observations recorded in Upper India. By W. L. Dallas. *With Diagrams.*

India. **Pullé.**

La Cartografia antica dell' India per Francesco L. Pullé. Parte i. Dai principi fino ai Bizantini e agli Arabi. *With Atlas.* (Studi Italiani di Filologia Indo-Iranica. Anno IV. Vol. iv. pp. xxiv. and 1–158.) Firenze: Tip. G. Carnesecchi e Figli, 1901. Size 9½ × 6. *Illustrations.* [To be reviewed.]

India. **Webber.**

The Forests of Upper India and their Inhabitants. By Thomas W. Webber. London: Edward Arnold, 1902. Size 9 × 6, pp. xiv. and 344. *Maps. Price* 12*s.* 6*d. net. Presented by the Publishers.* [See review, *ante*, p. 172.]

India—Census. ——

Census of India, 1901. Volume v.–B. Baluchistan. Part iii. Provincial Tables. By R. Hughes Buller. (Pp. 388. Bombay, 1902).—Volume xii. Burma. Part i. Report by C. C. Lowis. (Pp. iv., 152, lxxxiv., and vi. Rangoon, 1902).—Volume xviii. Baroda. Part i. Report by Jamshedji Ardeshir Dalal. (Pp. xlii. and 652. Bombay, 1902).—Volume xviii.–A. Baroda. Part ii. Tables. By J. A. Dalal. (Pp. 206. Baroda, 1902).—Volume xviii.–B. Baroda. Part iii. Provincial Tables. By J. A. Dalal. (Pp. 92. Baroda, 1902). *Maps, etc.* Size 13½ × 8½. *Presented by the Indian Government.*

India—Census. ——

Census of India, 1901. Vol. ii. Ajmer-Merwara. Part i. Report, by R. C. Bramley (pp. xviii. and 150. Ajmer, 1902). Vol. ii.-A. Ajmer-Merwara. Part ii. Tables by R. C. Bramley (pp. 210. Ajmer, 1902). Vols. v. and v.-A. (in one). Baluchistan. Part i. Report. Part ii. Imperial Tables, by R. Hughes-Buller (pp. 11, xii., 157, 6, and 84. Bombay, 1902). Vol. xiv. Coorg. Report and Tables, by W. Francis (Madras, 1902. Pp. v. and 62). Vol. xv. Madras. Part i. Report, by W. Francis (Madras, 1902. Pp. x. and 234). Vol. xv.-A. Madras. Part ii. Imperial Tables, by W. Francis (Madras, 1902. Pp. iv. and 384). Vol. xv.-B. Madras. Part iii. Provincial Tables, by W. Francis (Madras, 1902. Pp. 240). Vol. xvii-A. Punjab (British Territory and Native States) and North-west Frontier Province. Part ii. Tables, by H. A. Ross (Lahore, 1902). Vol. xxi. Gwalior. Part i. Report, by J. W. D. Johnstone (Lucknow, 1902. Pp. 174). Vol. xxi.-A. Gwalior. Part ii. Tables, by J. W. D. Johnstone (Lucknow, 1902. Pp. 588). *Maps, Diagrams, etc. Presented by the Census Office, India.*

India—Delhi. **Fanshawe.**

Delhi, Past and Present. By H. C. Fanshawe. London: John Murray, 1902. Size 9 × 6, pp. xxii. and 338. *Maps and Plates. Price* 15*s. net. Presented by the Publisher.*

Intended rather as a guide to Delhi for the use of visitors, than a systematic history of the city, though an account is given of Delhi in the Hindu and Mohammedan periods.

India and Ceylon—Tea Industry. *Abh. K.K.G. Ges. Wien* **4** (1902): 1–66. **Kiefer.**

Die Theeindustrie Indiens und Ceylons (Entwickelung und Heutiger Stand). Von Dr. A. Kiefer. *With Map.*

Indian Ocean. **Alcock.**

A Naturalist in Indian Seas; or, Four Years with the Royal Indian Marine Survey Ship *Investigator*. By A. Alcock. London: John Murray, 1902. Size 9½ × 6, pp. xxiv. and 328. *Map and Illustrations. Price* 18*s. net. Presented by the Publishers.* [See review, *ante*, p. 179.]

Indo-China. *B. Comité l'Asie Française* **2** (1902): 425–432. **Caix.**
Le traité franco-siamois. Par Robert de Caix. *With Maps.*

Indo-China. *A travers le Monde, Tour du Monde* **8** (1902): 341–342. ——
Le Traité franco-siamois. La nouvelle Frontière. Les Avantages politiques. *With Map.*

Japan—Bonin Islands. *Scottish G. Mag.* **18** (1902): 645–647. **Mason.**
Some Notes on the Bonin Islands. By W. B. Mason. *With Illustration.*

Japan—Formosa. *Scottish G. Mag.* **18** (1902): 561–576. **Campbell.**
Formosa under the Japanese: being Notes of a Visit to the Taichu Prefecture. By Rev. W. Campbell.

Malay Archipelago—Borneo. **Furness.**
The Home-Life of the Borneo Head-Hunters. Its Festivals and Folk-Lore. By William Henry Furness. Philadelphia: J. B. Lippincott & Co., 1902. Size 10 × 6½, pp. xii. and 190. *Plates. Presented by the Author.* [Review, *ante*, p. 170.]

Malay Archipelago—Borneo. **Spaan**
Tijds. K. Ned. Aard. Genoots. Amsterdam **19** (1902): 515–534, 959–976.
Reis van Berouw naar Boelongan. Door A. H. Spaan. *With Maps.*

Malay States. **Belfield.**
Handbook of the Federated Malay States. Compiled by H. Conway Belfield. London: E. Stanford (not dated). Size 8½ × 5½, pp. iv. and 170. *Maps and Plates. Price* 2*s.* 6*d. Presented by the Publisher.*

Malay States. ——
Straits Settlements. Reports on the Federated Malay States for 1901. London: Eyre & Spottiswoode, 1902. Size 13½ × 8½, pp. 82. *Price* 9*d.*

Malay States—Tin. **Collet.**
Octave J. A. Collet. L'Étain. Étude minière et politique sur les États Fédérés Malais. Bruxelles: Falk Fils, [not dated]. Size 10 × 6½, pp. 196. *Map and Illustrations. Price* 5 *fr. Presented by the Publisher.*

Northern Japan. **Batchelor.**
Sea-girt Yezo. Glimpses at Missionary Work in North Japan. By the Rev. John Batchelor. London: Church Missionary Society, 1902. Size 7½ × 6½, pp. viii. and 120. *Map and Illustrations. Price* 2*s.* 6*d. Presented by the Editorial Secretary C.M.S.*

Persia. **Landor.**
Across Coveted Lands; or, A Journey from Flushing (Holland) to Calcutta, Overland. By A. Henry Savage Landor. In two vols. London: Macmillan & Co., 1902. Size 9 × 5½, pp. (vol. i.) viii. and 462; (vol. ii.) viii. and 460. *Maps and Illustrations. Price* 30*s. net. Presented by the Publishers.*

Persia. **Morgan and Gauthier.**
Mission Scientifique en Perse. Par J. de Morgan. Tome Troisième. Études Géologiques. Partie iii. Echinides. Supplément par V. Gauthier. Paris: E. Leroux, 1902. Size 11 × 9, pp. 109–190. *Plates.*

Persia. *Iz. Imp. Rus. G.S.* **38** (1902): 127–170. **Zarudnyi.**
Preliminary Report on the Journey in Persia. By N. A. Zarudnyi. [In Russian.]

Russian Central Asia. *Globus* **82** (1902): 181–186. **Stenin.**
Das neue Taschkent, die russische Metropole in Zentralasien. Von P. v. Stenin. *With Illustrations.*

Russia—Kirghiz Steppe. *Zemlevedenie* (1902): 165–271. **Tikhonovich.**
Observations in the Kirghiz Steppes in the Seminalatunisk region. By N. Tikhonovich. [In Russian.] *With Map.*
See note in the Monthly Record.

Russia—Siberia—Altai. *Iz. Imp. Russ. G.S.* **38** (1902): 171–205. **Ignatoff.**
Exploration of Lake Teletskoi in the Altai in the summer of 1901. By P. G. Ignatoff. *With Maps.* [In Russian.]
Cf. note in the *Journal* for March, 1902, p. 370.

Russia—Siberia—Amur. *Questions Dipl. et Colon.* **14** (1902): 610–625. **Labbé.**
La région du fleuve Amour. Par Paul Labbé.

Russia—Siberia—Lake Baikal. *Iz. Imp. Russ. G.S.* **38** (1902): 228–271. **Drizhenko.**
Hydrographical Investigations in the Baikal. By Th. K. Drizhenko. *With Map.* [In Russian.] [See note, *ante*, p. 184.]

Siam. *Rev. Française* **27** (1902): 634–643. **Demanche.**
Le traité Franco-Siamois. Par G. Demanche. *With Maps.*

Siam. *Questions Dipl. et Colon.* **14** (1902): 449–456. ———
Le traité franco-siamois. *With Maps.*

AFRICA.

Algeria. **Cauvet.**
Renseignements Colon., Comité l'Afrique Française, No. 7 (1902): 137–143.
La culture du Palmier dans le Sud Algérien. Par le Capitaine Cauvet.

Algeria. *Quinzaine Colon.* **12** (1902): 637–641. **Chailley-Bert.**
L'Organisation de l'Algérie. Les territoires du Sud. Par J. Chailley-Bert.

Algeria. *Tour du Monde* **8** (1902): 493–516. **l'Harpe.**
Dans le Djebel-Amour. Par M. le Lieut. F. de l'Harpe. *With Illustrations.*

Algeria. *Rev. G.* **51** (1902): 527–536. ———
Territoires du Sud-Algérien. Par Gal M. *With Map.*

Ashanti—Gold-mining. **Daw.**
Ashanti Goldfields Corporation, Ltd. Lecture on the Development of Gold-mining on the Corporation's Property in Ashanti. By the General Manager and Consulting Engineer, John W. Daw. Size 10 × 8, pp. 94. *Plans and Illustrations. Presented by the Author.*

British East Africa—Uganda Railway. **Friedrich.**
Deutsche Rundschau G. **25** (1902): 72–77.
Die Ugandabahn. Von P. Friedrich. *With Map and Illustrations.*

British East Africa—Uganda Railway. ———
Africa. No. 4 (1902). Report by the Mombasa-Victoria (Uganda) Railway Committee on the Progress of the Works, 1901–1902. London: Eyre & Spottiswoode, 1902. Size 13 × 8½, pp. 16. *Maps and Section. Price 2s. 2½d.*

Cape Colony. ———
Statistical Register of the Colony of the Cape of Good Hope for the year 1901, with Supplement partly for March Quarter, 1902, and partly for half-year ended June 30, 1902. Cape Town: W. A. Richards & Sons, 1902. Size 13 × 8, pp. xvi., 350. *Diagram. Presented by the Colonial Secretary.*

Cape Colony. ———
Cape of Good Hope. Department of Agriculture. Annual Report of the Geological Commission, 1900. Cape Town, 1901. Size 10 × 7½, pp. xvi. and 94.
This is noticed in the Monthly Record.

Central Africa. **Arnot.**
Garenganze: West and East. By F. S. Arnot. London: W. G. Wheeler & Co. [not dated]. Size 6½ × 4½, pp. 142. *Map and Illustrations. Presented by the Author.*
A sketch of twenty years' work in South Central Africa, the earlier history related in the author's former work of the same name being much condensed.

Central Africa—Lake Kivu. **Maitre.**
B.S.G. Lille **37** (1902): 434–444; **38** (1902): 44–53, 112–121, 162–178.
Le bassin du lac Kivu. Par Henri Maitre.
Describes the results of journeys of the "White Fathers."

Dahome. *B.S.G. Marseille* **26** (1902): 153–165. **Borelli.**
Voyage au Dahomey. Conférence de Georges Borelli. *With Maps.*

Dahome. *Rev. Colon.* (1902): 501–530, 647–680. **Pradin.**
Secteur de Cabolé. Par R. Pradin. *With Map.*

Dahome—Railway. *Rev. Colon.* (1902): 681–706, 13–56. **Guyon.**
Chemin de fer du Dahomey: de la côte au Niger. Rapport de M. le commandant Guyon.

East Africa. **Toeppen**

Ali der ostafrikanische Seeräuber. Erzählungen aus dem Seeräuberleben der Lamu-Leute Ende der achtziger Jahre. Von Kurt Toeppen. Berlin: Dietrich Reimer (Ernst Vohsen), 1903. Size 9 × 6, pp. v. and 288. *Illustrations. Price* 5*m. Presented by the Publisher.*

Egypt. **Kelly.**

Egypt painted and described by R. Talbot Kelly. London: A. & C. Black, 1902. Size 9 × 6½, pp. xiv. and 240. *Coloured Plates. Price* 20*s. net. Presented by the Publishers.* [See reviews, *ante.*]

Egypt. **Petrie and others.**

A History of Egypt. Vol. i. From the Earliest Times to the xvith Dynasty. By W. M. Flinders Petrie. Fourth Edition, pp. xxiv. and 264.—Vol. ii. During the xiith and xiiith Dynasties. 1896, with additions to 1898. By W. M. Flinders Petrie. Third Edition, pp. xvi. and 354.—Vol. iv. Under the Ptolemaic Dynasty. By J. P. Mahaffy. Pp. xiv. and 256.—Vol. v. Under Roman Rule. By J. Grafton Milne. Pp. xiv. and 262.—Vol. vi. In the Middle Ages. By Stanley Lane-Poole. Pp. xvi. and 382. London: Methuen & Co., 1898–1901. Size 8 × 5. *Maps and Illustrations.*

Egypt. **Barron and Hume.**

Notes on the Geology of the Eastern Desert of Egypt. By T. Barron and W. F. Hume, D.Sc. London: Dulau & Co., 1902. Size 8½ × 5½, pp. 42. *Presented by the Publishers.*

Egypt. **Mardon.**

A Geography of Egypt and the Anglo-Egyptian Sudan. By H. W. Mardon. London, etc.: Blackie & Son, Ltd. Size 7½ × 5, pp. 214. *Maps and Illustrations. Two copies. One presented by the Author, the other by the Publishers.*

Although intended primarily for Egyptian schools, this book contains information which may be of use to a wider circle of readers. The mode of treatment is on the whole satisfactory.

Egypt. **Willcocks.**

The Nile Reservoir dam at Assuan, and after. [Cairo, 1902.] Size 10 × 6½, pp. 14. *Presented by the Author.*

A Prefatory Note to the work bearing the above title, urging the advantages of the equatorial lakes as storage reservoirs.

Egypt. *Scottish G. Mag.* **18** (1902): 637–645. ——

The Irrigation of Egypt: What the British have done. *With Maps and Illustrations.*

Based on Prof. Brunhes' work.

Egypt—Geology. *C. Rd.* **135** (1902): 803–804. **Fourtau.**

Sur le Grès nubien. Note de R. Fourtau.

Egypt—White Nile. *B.S. Khédiv. G.* **5** (1902): 693–742. **Innes.**

Voyage au Nil Blanc, pour des recherches zoologiques. Par le Dr. W. Innes Bey. *With Illustrations.*

Fernando Po and Spanish Guinea. *B.R.S.G. Madrid* **44** (1902): 190–347. **d'Almonte.**

Someras notas para contribuir á la descripción física, geológica y agrológica de la zona noroeste de la isla de Fernando Póo y de la Guinea continental española, con algunas observaciones sobre vias de comunicación y la colonización de aquellos territorios. Por Enrique d'Almonte. *With Sketches.*

French Congo. *B.S. Bretonne G.* **20** (1902): 337–359. **Toqué.**

Essai sur l'Origine et l'Évolution de la race Banda (Afrique Centrale). Par G. Toqué.

French Congo. *B. Comité l'Afrique Française* **12** (1902): 404–408. **Bruel.**

Le Chari et le Bahr Sara. Georges Bruel. *With Map.*

Contests the view of M. Maistre that the Bahr Sara is the principal head-stream of the Shari.

French Congo. **Löfler.**

Renseignements Colon., Comité l'Afrique Française No. **6** (1902): 121–128.

De la Sanga au Chari et à la Bénoué: les reconnaissances du capitaine Löfler. *With Map.*

See note in Monthly Record for November, 1902 (p. 540).

French Congo. *Mouvement G.* **19** (1902): 517–518. ——

L'exploration du bassin de la Poko. *With Map.*

The Poko is a tributary of the Ubangi.

French Guinea. **Normand.**

Renseignements Colon., Comité l'Afrique Française **7** (1902): 143–149.

Notes sur la Guinée française. Par Capitaine R. Normand.

German East Africa. *Kolon. Z.* **3** (1902): 391–393, 411–412, 447–449. **Herfurth**

Die Zwischenseenhochländer. Von A. Herfurth.

German South-West Africa. **Gerding.**

Die Bahn Swakopmund-Windhoek, von Gerding. Berlin: W. Susserott, 1902. Size 10 × 7, pp. 381–406. *Map and Illustrations. Price* 2*s.*

Madagascar. *Rev. Madagascar* **4** (1902): 385–417. **Jourdran.**

Mission médicale faite dans le Nord-Ouest de l'Ile. Par Dr. Jourdran. *With Illustrations.*

Madagascar. **Laffay.**

Rev. Madagascar **4** (1902): 321–333, 408–420; **4** (2 Sem.) (1902): 22–38, 435–448.

Le bassin lacustre d'Alaotra à Madagascar. Par Dr. Laffay.

Madagascar. *La G., B.S.G. Paris* **6** (1902): 277–283. **Gallieni.**

Les travaux géographiques à Madagascar. Par Général Gallieni. *With Map.*

Nigeria. *Scottish G. Mag.* **18** (1902): 631–637. **Macalister.**

The Aro Country, Southern Nigeria. By Donald A. Macalister. *With Illustrations.*

Nile. *B.S. d'Études Colon.* **9** (1902): 497–515, 583–598, 653–674. **Henry.**

Dans les Marais du Haut Nil. Par Commandant Henry.

The author is an officer in the service of the Congo State.

Portuguese East Africa. *B.S.G. Lisboa* **20** (1902): 5–17. **Durão.**

Reconhecimento e occupação dos territorios entre o Messangire e os picos Namuli. Por Portugal Durão.

Sahara. *Rev. G.* **51** (1902): 335–343. **Dornin.**

Du Tidikelt au Niger. Par Pierre Dornin. *With Map.*

Discusses the question of communication across the Sahara in the light of Lieut. Cottenest's journey.

Sahara. *B.S.G. Marseille* **26** (1902): 207–216. **Lugan.**

Souvenirs de colonne au Sahara. Par Colonel Lugan.

Senegal. *Rev. Colon.* (1902): 87–124, 377–423, 551–606, 707–744. **Courtet.**

Étude sur le Sénégal. Par M. Courtet. *With Maps.*

Senegal. **Tellier.**

G. Tellier. Autour de Kita. Étude Soudanaise. Paris, etc.: H. C. Lavauzelle [not dated]. Size 10 × 6½, pp. 316. *Maps. Price* 5*s.*

A detailed account of a district in the upper basin of the Senegal.

Somaliland. **McNeill.**

In Pursuit of the "Mad" Mullah. Service and Sport in the Somali Protectorate. By Captain Malcolm McNeill. With a chapter by Lieut. A. C. H. Dixon. London: C. Arthur Pearson, Ltd., 1902. Size 8 × 5, pp. xi. and 314. *Plan and Illustrations. Price* 6*s. Presented by the Publishers.*

South Africa—Historical. *La G., B.S.G. Paris* **6** (1902): 284–288. **Dehérain.**

Voyage du landdrost Starrenburg au nord du Cap de Bonne-Espérance en 1705. Par E. Dehérain.

South Africa—Labour Question. *Nineteenth Century* **52** (1902): 724–731. **Johnston.**

The Native Labour Question in South Africa. By Sir Harry H. Johnston, G.C.M.G., etc.

Spanish Guinea. *B.R.S.G. Madrid* **44** (1902): 48–69. **Coso.**

Demarcación de la Guinea española. Por el capitán de Estado Mayor D. Manuel Nieves Coso. *With Map.*

Tunis. *Questions Dipl. et Colon.* **14** (1902): 513–524. **Pensa.**

L'avenir de la Tunisie. L'industrie européenne et l'industrie indigène. Par Henri Pensa.

Uganda. **Hobley.**

Eastern Uganda, an Ethnological Survey. By C. W. Hobley. (Anthropological Institute, Occasional Papers, No. 1.) London: Anthropological Institute, 1902. Size 11 × 7½, pp. 96. *Map and Plates. Price* 10*s. net. Presented by the Anthropological Institute.*

This will be specially noticed.

West Africa. ———

Hints and Suggestions for Travelling on the West Coast of Africa. London: Bishop & Co. [not dated]. Size 6½ × 4½, pp. 30. *Price* 1*s. Presented by the Publishers.*

NORTH AMERICA.

Alaska. *Popular Sci. Monthly* **62** (1902): 183-184. **Hollister.**

The Size of Alaska. By George B. Hollister. *With Map.*

Canada. **Tyrrell.**

Department of the Interior. Report on an Exploratory Survey between Great Slave lake and Hudson Bay, Districts of Mackenzie and Keewatin. By J. W. Tyrrell. (Appendix No. 26, Part iii., Annual Report, 1901.) Ottawa, 1902. Size 10 × 6½, pp. 62. *Illustrations. Presented by the Surveyor-General of Canada.*

See note in *Journal* for September, 1902 (p. 340).

Canada. ———

Fourth Annual Report of the Geographic Board of Canada for the year ending June 30, 1902. (Supplement to the Thirty-fifth Annual Report of the Department of Marine and Fisheries. Marine.) Ottawa, 1902. Size 10 × 6½, pp. 16.

Gives decisions from July 1, 1901, to June 30, 1902. Among the forms adopted are Athabaska, Backs river (not Great Fish river), Dubawnt river (not Doobaunt), Thelon river (not Ark-e-leenik).

Mexico. **Schiess.**

Quer durch Mexiko. Vom Atlantischen zum Stillen Ocean von Dr. Wilhelm Schiess. Berlin: Dietrich Reimer (Ernst Vohsen), 1902. Size 10½ × 7, pp. xiii. and 234. *Map and Illustrations. Price* 8 *m. Presented by the Publishers.*

Mexico—Vera Cruz. ———

Veracruz Port-Works. Descriptive Memoir of the great undertaking which is to-day being inaugurated. March 6, 1902. Size 9 × 6½, pp. 22. *Plan and Illustrations. Presented by Mr. Henry A. Case.*

North America—Historical. **Fischer and Soulsby.**

The Discoveries of the Norsemen in America, with special relation to their cartographical representation. By Joseph Fischer. Translated from the German by Basil H. Soulsby. London: Henry Stevens, Son & Stiles, 1903. Size 10½ × 6½, pp. xxiv. and 130. *Maps. Presented by the Translator and Publishers.*

[See reviews, *ante*, p. 181.]

North America—Historical. **Henry, Thompson, and Coues.**

New Light on the Early History of the Greater North-West. The Manuscript Journals of Alexander Henry, Fur Trader of the North-West Company, and of David Thompson, Official Geographer and Explorer of the same Company, 1799–1814. Exploration and Adventure among the Indians on the Red, Saskatchewan, Missouri, and Columbia rivers. Edited with Copious Critical Commentary by Elliot Coues. In three Volumes. Vol. i. The Red River of the North (pp. xxviii. and 446); Vol. ii. The Saskatchewan and Columbia Rivers (pp. vi. and 447–916); Vol. iii. Index and Maps (pp. 917–1028). New York: Francis P. Harper, 1897. Size 9 × 6. *Maps and Portrait. Price* £2 10*s.*

United States—Massachusetts. *J. Geology* **10** (1902): 513-517. **Cleland.**

The Landslides of Mounts Greylock and Briggsville, Mass. By H. F. Cleland. *With Map and Illustration.*

United States—Missouri. **Marbut.**

Geological Survey of Missouri. Vol. xii. part ii. Sheet Reports Nos. 6–10. Reports on Areal Geology. By Curtis F. Marbut. Published by the Geological Survey. Jefferson City, 1898. Size 10 × 7, pp. 17–372. *Maps and Plates. Two copies, one presented by the Survey, the other by Mr. C. F. Marbut.*

United States—Missouri. **Marbut.**

The Evolution of the Northern Part of the Lowlands of South-Eastern Missouri. By C. F. Marbut. (The University of Missouri Studies. Volume i. No. 3, 1902.) Size 10 × 7, pp. viii. and 64. *Maps and Plates.* *Price* $1.25.

This was noticed in the Monthly Record for January (p. 82).

United States—New England. **Davis.**

River Terraces in New England. By W. M. Davis. (Bulletin Museum Comparative Zoology at Harvard College, vol. xxxviii., Geological Series, vol. v. No. 7.) Cambridge, Mass., 1902. Size 10 × 6½, pp. 281–346. *Diagrams.*

United States—Texas. *J. Franklin I.* **154** (1902): 143–156, 225–238, 263–281. **Hill.**

The Beaumont Oil Field, with Notes on other Oil Fields of the Texas Region. By Robert T. Hill. *Map and Section.* *Also separate copy, presented by the Author.*

CENTRAL AND SOUTH AMERICA.

Argentine Republic—Historical. *An. S. Ci. Argentina* **54** (1902): 113–137. **Outes.**

El primer establecimiento español en el territorio argentino (1527–1902). Noticia histórico-geográfica. Por Félix F. Outes. *With Maps.*

Bolivia. ——

Carta geográfica del N. O. de Bolivia, La Paz, 1902. Size 11 × 7½, pp. 6. *Map.*

Shows the frontiers claimed by Peru, Bolivia, and Brazil in this region.

Brazil—Bahia. *Rev. I.G. e Hist. Bahia* **8** (1901): 19–30. **Praguer.**

Riqueza mineral do Estado da Bahia. Phenomenos geologicos e mineralogicos, especialmente na zona de Santo Amaro. Por Henrique Praguer.

Central America. *G.Z.* **8** (1902): 489–515. **Sapper.**

Die mittelamerikanische Landschaft. Von Dr. Karl Sapper. *With Plates.*

Central America—Canal. **Serrell.**

The American Isthmian Canals. The Darien Mandingo Canal. By Edward Wellman Serrell. New York, 1902. Size 9½ × 6½, pp. 16. *Presented by Colonel G. E. Church.*

Central America—Canal. **Serrell.**

The American Isthmian Canals. The Darien Mandingo Canal. By Edward Wellman Serrell. New York, 1902. Size 9½ × 6½, pp. 16. *Presented by the Author.*

Chile. *Internat. Quarterly* **1** (1902): 1–252. ——

Brief Notes on Chile. Geographical Situation, Boundaries, Extent and Surface, General Description, Climate, Productions, Population, History, Government, Industry and Commerce; Description of Provinces; General Catalogue of Exhibits at Pan-American Exposition, with List of Awards. *With Illustrations.*

Colombia. **Vergara y Velasco.**

Nueva Geografia de Colombia escrita por regiones naturales por F. J. Vergara y Velasco. Tomo i. Geografia General. Bogota, 1901. Size 10 × 7, pp. viii., 1008, lxxiv., and 46. *Maps and Illustrations.*

This will be reviewed elsewhere.

Guatemala. *Petermanns M.* **48** (1902): 193–195. **Sapper.**

Das Erdbeben in Guatemala vom 18. April 1902. Von Prof. Dr. Karl Sapper. *With Map.*

Jamaica—Bibliography. **Cundall**

Bibliographia Jamaicensis. A List of Jamaica Books and Pamphlets, Magazine Articles, Newspapers, and Maps, most of which are in the Library of the Institute of Jamaica. By Frank Cundall. Kingston, Jamaica, [1902]. Size 8½ × 5½, pp. 84. *Presented by the Institute of Jamaica.*

Orinoco. **Triana.**

Down the Orinoco in a Canoe. By S. Pérez Triana. With an Introduction by R. B. Cunninghame Graham. London: W. Heinemann, 1902. Size 8 × 5, pp. xvi. and 254. *Map.* *Price* 6*s.*

Patagonia. *Rev. Museo La Plata* **10** (1902): 269–281. **Lehmann-Nitsche.**

La pretendida existencia actual del Grypotherium, supersticiones araucanas referentes á la lutra y al tigre. Por Dr. Robert Lehmann-Nitsche.

West Indies—Eruptions. *American J. Sci.* **14** (1902): 319–350. **Hovey.**
Observations on the Eruptions of 1902 of La Soufrière, St. Vincent, and Mount Pelée, Martinique. By E. O. Hovey. *With Maps and Illustrations.*

AUSTRALASIA AND PACIFIC ISLANDS.

Australasia. *G.Z.* **8** (1902): 425–450, 516–534. **Ratzel.**
Der australische Bund und Neuseeland. Von F. Ratzel.
An outline of existing conditions in Australasia.

Fiji—Meteorology. **Vaughan.**
Fiji. Meteorological Observations taken at Suva during 1901. By J. D. W. Vaughan. Suva: E. J. March, 1902. Size 13¼ × 8¼, pp. 16.

Hawaii. *Monthly Weather Rev.* **30** (1902): 364–368. ———
Meteorology in Hawaii. *With Maps.*

New Guinea. *Globus* **82** (1902): 247–253. **Weule.**
Zwergvölker in Neu-Guinea? Von Prof. Dr. K. Weule. *With Illustrations.*

New South Wales. *J. and P.R.S. New South Wales* **35** (1901): 223–242. **McKinney.**
Projects for Water Conservation, Irrigation, and Drainage in New South Wales. By H. G. McKinney.

New South Wales. **Coghlan.**
The Wealth and Progress of New South Wales, 1900–01. By T. A. Coghlan. Sydney: W. A. Gullick, 1902. Size 9 × 5½, pp. xvi. and 1044. *Map. Presented by the Agent-General for New South Wales.*

New South Wales. ———
1902. Legislative Assembly. New South Wales. Annual Report of the Department of Mines, New South Wales, for the year 1901. Sydney: W. A. Gullick, 1902. Size 13 × 8, pp. 196. *Maps, Diagrams, and Illustrations. Price 7s. 6d. Presented by the Agent-General for New South Wales.*

New South Wales. ———
The Year-Book of New South Wales. Compiled by the Editor of the Year-Book of Australia for circulation by the Agent-General in London, 1903. Size 8½ × 5½, pp. 168. *Map. Presented by the Agent-General for New South Wales.*

New South Wales—Historical. **Bladen.**
Historical Records of New South Wales. Vol. vii. Bligh and Macquarie, 1809, 1810, 1811. Edited by F. M. Bladen. Issued by direction of the Honorable J. Perry. Sydney: W. A. Gullick, 1901. Size 8½ × 5½, pp. lx. and 690. *Plan and Plates. Presented by the N.S.W. Government.*
One of a valuable series of volumes in course of publication, in which practically the whole of the Records relating to the foundation, progress, and government of New South Wales are being printed in full.

New Zealand. *T. and P. New Zealand I.* **34** (1901): 362–386. **Carse.**
On the Flora of the Manku District. By H. Carse.

New Zealand. *T. and P. New Zealand I.* **34** (1901): 440–444. **Park.**
On the Secular Movements of the New Zealand Coast-line. By Prof. James Park.

New Zealand. **Dadelszen.**
The New Zealand Official Year-Book, 1902. Prepared . . . by E. J. von Dadelszen. Wellington, N.Z.: J. Mackay, 1902. Size 8½ × 5½, pp. vi. and 690. *Maps, Diagrams, and Illustrations.*

New Zealand. *National G. Mag.* **13** (1902): 342–352. **Lloyd.**
Problems of the Pacific—New Zealand. By H. D. Lloyd.

Pacific—Rurutu and Rimatara. *Rev. Colon.* (1902): 1–11. **Garnier.**
Rapport sur le percement des passes de Rurutu et de Rimatara, adressé par le capitaine de port de Papeete à M. le Gouverneur des établissements français de l'Océanie. *With Illustrations.*

Queensland. *Queensland G.J.* **17** (1901–1902): 33–48. **Traill.**
Mount Coot-tha Reserve. By W. H. Traill. *With Illustrations.*

Queensland. ———

1902. Queensland. Report of the Registrar-General on Agricultural and Pastoral Statistics for 1901. Size 13 × 8, pp. 70.

POLAR REGIONS.

Antarctic. *B.S.R. Belge G.* **26** (1902): 446–450. **Lecointe.**

La Terre Alexandre 1^er^. Par G. Lecointe.

Discusses the identity of lands seen by Bellingshausen and by the Belgian Antarctic Expedition.

Arctic. *Church Miss. Intelligencer* **27** (1902): 898–904. **Peck.**

Arctic Travelling: Two Hundred Miles in an Open Boat. Notes of a Journey from Cumberland Sound to Frobisher Bay. By the Rev. E. J. Peck.

Arctic—Peary's Expedition. *B. American G.S.* **34** (1902): 337–340. ———

Mr. Peary's Return. *With Map.*

Polar Exploration. **Hassert.**

Die Polarforschung. Geschichte der Entdeckungsreisen zum Nord- und Südpol von den ältesten Zeiten bis zur Gegenwart. Von Prof. Dr. Kurt Hassert. Leipzig: B. G. Teubner, 1902. Size 7½ × 5, pp. iv. and 156. *Maps.*

MATHEMATICAL GEOGRAPHY.

Astronomy—Star Catalogue. **Kam.**

Catalog von Sternen, deren Oerter durch selbstständige Meridian-Beobachtungen bestimmt worden sind, aus Band 67 bis 112 der Astronomischen Nachrichten reducirt auf 1875, o von Dr. N. M. Kam, nach dessen Tod herausgegeben von H. G. Van de Sande Bakhuyzen. Amsterdam: Joh. Müller, 1901. Size 12 × 10½, pp. x. and 368. *Presented by the K. Akademie van Wetenschappen, Amsterdam.*

Cartography. ———

Service Géographique de l'Armée. Rapport sur les travaux exécutés en 1901. Paris, 1902. Size 10 × 6½, pp. 40. *Maps.*

Besides the survey work in France, Algeria, and Tunis, progress has been made with the new edition of the map of Africa, and with maps of parts of Europe, Asia, and America, on the scale of 1 : 1,000,000.

Cartography—Areas. *Petermanns M.* **48** (1902): 213–215. **Wagner.**

Die Einführung von Flächenzahlen auf den Karten. Von Prof. Dr. Hermann Wagner.

Cartography—Map-collection. ———

Musée rétrospectif de la Classe 14. Cartes et appareils de géographie et de cosmographie. Topographie, à l'Exposition Universelle Internationale de 1900, à Paris. Rapport du Comité d'Installation. Size 11 × 7½, pp. 86. *Illustrations. Presented by M. Henri Sarrian.*

Surveying. **Burrard.**

Hand-Book of Professional Instructions for the Trigonometrical Branch, Survey of India Department. [Second Edition.] Prepared by Major S. G. Burrard. Calcutta, 1902. Size 10 × 6, pp. xii., 268, and 46. *Presented by the Surveyor-General.*

Tide-gauges. *P.I. Civil Engineers* **149** (1902): 223–244. **Dawson.**

Tide-gauges in Northern Climates and Isolated Situations. By Dr. W. B. Dawson. *With Map and Diagrams. Also separate copy, presented by the Author.*

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Climatology. *Z. Ges. Erdk. Berlin* (1902): 611–629, 671–693. **Frech.**

Studien über das Klima der geologischen Vergangenheit. Von Prof. Dr. Fritz Frech. *With Maps.*

Geomorphology—Hanging Valleys. **Garwood.**

Quarterly J. Geolog. S. **58** (1902): 703–718.

On the origin of some Hanging Valleys in the Alps and Himalayas. By Prof. E. J. Garwood. *With Map and Plates.*

Geomorphology—Moors. *Scottish G. Mag.* **18** (1902): 587–597. **Smith.**

The Origin and Development of Heather Moorland. By Dr. W. G. Smith.

A careful analysis of the work on the German heaths by Graebner (*Journal*, vol. xx. p. 551).

Gravity. *C. Rd.* **135** (1902): 774–776. **Collet.**

La pesanteur le long du parallèle moyen. Note de J. Collett.

Kumatology. *J. Manchester G.S.* **17** (1901): 197–221. **Greenwood.**

The Life of a Wave from its Cradle to its Grave. By Captain W. Nelson Greenwood. *With Illustrations.*

Kumatology—Ripple-marks and Dunes. **Bertololy.**

Kräuselungsmarken und Dünen. Von Dr. Ernst Bertololy. (Münchener Geographische Studien, herausgegeben von Siegmund Günther. Neuntes Stück.) München: T. Ackermann, 1900. Size 9½ × 6, pp. iv. and 190.

Meteorology. *J.G.* **1** (1902): 400–402. **Jefferson.**

The Influence of Ponds and Rivers on Atmospherical Temperatures. By Prof. M. S. W. Jefferson.

Oceanography. **Schott.**

Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia" 1898–1899. Im Auftrage des Reichsamtes des Innern herausgegeben von Carl Chun. Erster Band. Oceanographie und Maritime Meteorologie im Auftrage des Reichs-Marine-Amtes bearbeitet von Dr. Gerhard Schott. Text and Atlas. Jena: Gustav Fischer, 1902. Size 13½ × 10½, pp. xii. and 404. *Diagrams, Map, and Illustrations.*

To be reviewed.

Oceanography. **Krümmel.**

Das Wissen der Gegenwart. Deutsche Universal-Bibliothek für Gebildete. 52 Band. Der Ozean. Eine Einführung in die Allgemeine Meereskunde. Von Dr. Otto Krümmel. Zweite, Durchweg Verbesserte Auflage. Wein and Prag: F. Tempsky; Leipzig: G. Freytag. 1902. Size 7½ × 5, pp. viii. and 286. *Maps and Illustrations. Price 4m.*

Oceanography—Currents. **Russell.**

J. and P.R.S. New South Wales **35** (1902): 336–346.

Current Papers, No. 6. By H. C. Russell. *With Charts. Also separate copy, presented by the Director of the Sydney Observatory.*

Oceanography—Soundings. *Ann. Hydrographie* **30** (1902): 513–515. **Simonsen.**

Lothungen an der ostküste Südamerikas. Von Kapt. A. Simonsen.

Oceanography—Soundings. *Ann. Hydrographie* **30** (1901): 516–532. ———

Die Lothungsreise des Kabeldampfers "von Podbielski" über den Nordatlantischen ozean im Sommer 1902. *With Chart.*

Snow. *Rev. Museo La Plata* **10** (1902): 313–326. **Hauthal.**

Nieve penitente. Por Rodolfo Hauthal. *With Plates.*

Cf. note in the *Journal* for September, 1902 (p. 347).

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Commercial—Chinchona. *Abh. K.K.G. Ges. Wien* **4** (1902): 1–44. **Dronke.**

Die Verpflanzung des Fieberrindenbaumes aus seiner Südamerikanischen Heimat nach Asien und anderen Ländern. Von Julius Dronke. *With Maps.*

Historical—Gerritsz. **Wichmann.**

Dirck Gerritsz. Ein Beitrag zur Entdeckungsgeschichte des 16ten und 17ten Jahrhunderts. Von Dr. Arthur Wichmann. Groningen: J. B. Wolters, 1899. Size 10 × 6½, pp. 104.

A valuable monograph on Dirck Gerritsz and his voyages. Translations of hitherto unpublished documents are given.

Historical—Mile. *Rev. G. Italiana* **9** (1902): 473–498. **Uzielli.**

Antonio di Tuccio Manetti, Paolo Toscanelli e la lunghezza delle miglia nel Secolo delle Scoperte. Per Gustavo Uzielli.

Historical—Travel. *B.S.R. Belge G.* **26** (1902): 379–404. **Du Bois.**

L'Évolution des voyages. Par Albert Du Bois.

Political Geography—Boundaries. **D'Almeida.**

B.S.G. Com. Bordeaux **28** (1902): 341-348.

La notion des frontières en géographie politique. By P. Camena d'Almeida.

Population of Cities. *La G., B.S.G. Paris* **6** (1902): 313-321. **Weinreb.**

Les grandes cités du monde. By T. Weinreb.

Gives the populations according to recent censuses.

BIOGRAPHY.

Bright. **Bright.**

The Life Story of the Late Sir Charles Tilston Bright, Civil Engineer: with which is incorporated the story of the Atlantic Cable, and the first telegraph to India and the Colonies. By his brother, Edward Brailsford Bright, and his son, Charles Bright. 2 volumes. Westminster: A. Constable & Co., [not dated]. Size 9 × 5½, pp. (vol. i.) xx. and 506; (vol. ii.) xii. and 702. *Portraits and Illustrations. Presented by Mr. Charles Bright.*

Gastaldi. **Grande.**

Stefano Grande. Notizie sulla vita e sulle opere di Giacomo Gastaldi, Cosmografo Piemontese del Secolo xvi. Con Prefazione di Luigi Hugues. Torino: Carlo Clausen, 1902. Size 9½ × 6½, pp. 100.

Powell. *Science* **16** (1902): 782-790.

In Memory of John Wesley Powell.

On the proceedings of a meeting convened by the Smithsonian Institution.

Vasco da Gama. **Telles da Gama.**

Le Comte-Amiral D. Vasco da Gama. Par D. Maria Telles da Gama. Paris: A. Roger and F. Chernoviz, 1902. Size 10½ × 7½, pp. xxvi. and 340. *Map. Portraits and Illustrations. Price 25s.*

GENERAL.

Almanac. ———

Annuaire pour l'an 1903, publié par le Bureau des Longitudes. Avec des Notices Scientifiques. Paris: Gauthier Villars. Size 6½ × 4, pp. viii., 668, 54, 10, 4, 34, and 38.

Encyclopædia Britannica. ———

The New Volumes of the Encyclopædia Britannica, constituting, in combination with the existing volumes of the Ninth Edition, the Tenth Edition of that work. The eighth (ninth) of the new volumes, being volumes xxxii. (xxxiii.) of the complete work. London, etc., 1902. Size 11 × 8½, pp. (vol. xxxii.) xxxviii. and 872: (vol. xxxiii.) xviii. and 946. *Illustrations, etc.*

The body of the work is completed by these volumes, only the maps and Index being still to appear.

Encyclopædia Britannica. ———

The New Volumes of the Encyclopædia Britannica. . . . The sixth (seventh) of the New Volumes, being Volume xxx. (xxxi.) of the Complete Work. London: A. & C. Black; and the *Times*, 1902. Size 11½ × 8½, pp. (vol. xxx.) xv. and 846; (vol. xxxi.) xx. and 910. *Maps and Illustrations.*

The more important geographical articles in these volumes include Limnology and Oceanography, by Dr. H. R. Mill; Malay Archipelago, by Dr. H. O. Forbes; Map, by E. G. Ravenstein and Dr. S. Ruge; and Polar Regions, by Sir Clements Markham, Dr. Nansen, and Dr. H. R. Mill.

French Colonies. *Questions Dipl. et Colon.* **14** (1902): 665-681. **Buret.**

Les villes de santé dans nos Colonies. Par Maurice Buret.

Geography. *P. American Philosoph. S.* **41** (1902): 235-259. **Davis.**

Systematic Geography. By W. M. Davis.

Geography. **Günther.**

Entdeckungsgeschichte und Fortschritte der wissenschaftlichen Geographie im neunzehnten Jahrhundert. Von Dr. Siegmund Günther. Berlin: S. Cronbach, 1902. Size 7½ × 5, pp. 232. *Price 2s. 6d.*

An excellent summary of progress in exploration and scientific geography during the nineteenth century.

Norwegian Language. **Poestion.**

Norwegisches Lesebuch. Lesestücke in der norwegischen Reichssprache. Mit einem Anhange von Lesestücken im "Landsmaal" nebst grammatikalischen Vorbemerkungen über das "Landsmaal" und zwei Glossaren. Von J. C. Poestion. Wien, etc.: A. Hartleben [not dated]. Size 7 × 4½, pp. viii. and 184. *Price 2m. Presented by the Publisher.*

Telegraphic Code. **Atkinson.**

The Via Eastern Telegraphic Social Code. Issued under the Authorization of the Eastern Telegraph Company, etc. Compiled by Robert T. Atkinson. London: W. Hutchinson & Co., 1902. Size 8 × 5½, pp. 320. *Price 5s. net. Map. Presented by the Publishers.*

Travel. **Boehm.**

Over the World. By Sir Edgar Collins Boehm, Bart. London: Horace Cox, 1902. Size 7½ × 5, pp. xiv. and 366. *Illustrations. Presented by the Publishers.*

Year-book. **Trübner.**

Minerva. Jahrbuch der Gelehrten Welt. Herausgegeben von Dr. K. Trübner. Zwölfter Jahrgang, 1902-1903. Strassburg: Karl J. Trübner, 1903. Size 6 × 4½, pp. xl. and 1332. *Portrait.*

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

Austria-Hungary. **Artaria.**

Eisenbahn- u. Postkarte von Oesterreich-Ungarn. Vierte Neubearbeitung. 3 Auflage. Scale 1: 1,500,000 or 23·6 stat. miles to an inch. Vienna: Verlag von Artaria & Co., 1903. *Price 2.20 kronen. Presented by the Publishers.*

England and Wales. **Ordnance Survey.**

ORDNANCE SURVEY OF ENGLAND AND WALES:—Revised sheets published by the Director-General of the Ordnance Survey, Southampton, from December 1 to 31, 1902.

1 inch:—

With hills in brown or black, 79, 89, 102, 103, 104, 120, 142, 165 (engraved). 1*s. each.*

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6-inch—County Maps:—

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Cambridgeshire, XIII. 5, 9; XXVII. 14; XXXI. 14, 15; XXXIX. 5; XL. 1, 2, 4, 5; XLVI. 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16; XLVII. 13, 15, 16; XLVIII. 5; LIII. 2, 3, 6, 9, 10, 13; LV. 13. **Dorsetshire,** XXI. 5, 15, 16; XXX. 5, 7, 9, 15; LIV. 8; LVIII. 15. **Gloucestershire,** X. 6; XV. 15; XXII. 16; XXVII. 7, 8, 9, 10, 11, 12, 14; XXIX. 8, 11; XLIII. 8, 9, 11, 12; XLIV. 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 15, 16; XLV. 1, 9; XLVI. 2; LII. 7, 8; LIV. 8, 10; LVIII. 12, 14; LX. 11; LXV. 12, 15; LXVIII. 8, 15, 16; LXX. 13, 14; LXXIV. 13. **Leicestershire,** V. 5, 13; IX. 8, 16. **Montgomeryshire,** XXX. 16; XXXI. 14; XXXVI. 16; XXXVII. 6, 8, 9, 11, 15; XXXVIII. 3, 6, 8; XLIII. 8, 10, 13; XLVII. 16; XLVIII. 7, 9, 10, 11, 15; LII. 2. **Radnorshire,** III. 15; IIIA. 16; VII. 15, 16; VIII. 2, 8. **Shropshire,** XLVI. 16; XLVII. 3, 4, 7, 8, 10, 14; XLVIII. 4; LI. 14; LIII. 8; LIV. 1, 6, 8; LV. 3, 14; LVIII. 1, 2, 3, 4, 5, 6, 7, 10, 11; LIX. 9, 10; LXIII. 1, 5, 11. **Staffordshire,** LXII. 11, 12; LXIII. 12; LXV. 6. **Warwickshire,** V. 6. **Worcestershire and Do. (Det. Nos. 4, 6, and 7);** VIII. 14; XIV. 2, 3, 5, 6, 7, 8, 9, 10, 11, 12; LVIII. 15; LXII. 16; LXIII. 9, 13. **Yorkshire,** CCLXXXIV. 10; CCLXXXV. 9; CCLXXXVI. 5, 9; CCLXXXIX. 16; CCXC. 9; CCXCII. 1, 5. 3*s. each.*

4 miles to 1 inch—Miscellaneous Maps:—

Petty Sessional Division Maps in colour:—Herefordshire, Lancashire, Norfolk, Northamptonshire, Nottinghamshire, Oxfordshire, Pembrokeshire, Radnorshire, Somerset, Staffordshire, Surrey, Sussex, Warwickshire, Westmorland, Wiltshire, Yorkshire (North Riding), Yorkshire (West Riding). *6d. each.*

(*E. Stanford, London Agent.*)

England and Wales. **Bartholomew.**

The Survey Atlas of England and Wales. A series of eighty-four plates of maps and plans, with Descriptive Text, illustrating the Topography, Physiography, Geology, Climate, and the Political and Commercial Features of the Country. Designed by and prepared under the direction of J. G. Bartholomew, F.R.S.E., F.R.G.S. Edinburgh: John Bartholomew & Co. Under the patronage of the Royal Geographical Society. 1903. *To be published in twenty-one monthly parts at 2s. 6d. each.*

A special notice of this atlas is given in this number of the *Geographical Journal*, p. 164.

Europe. **Bureau International des Administrations Télégraphiques, Bern.**

Carte des Communications Télégraphiques du Régime Européen, dressée d'après des documents officiels par le Bureau International des Administrations Télégraphiques. Scale 1 : 5,150,000 or 81·1 stat. miles to an inch. 4 sheets. Bern: Bureau International des Administration Télégraphiques.

ASIA.

Asia Minor. **Fitzner.**

Regenkarte von Klein-Asien. Von R. Fitzner. Scale 1 : 3,700,000 or 58·3 stat. miles to an inch. *Petermanns Geographische Mitteilungen*, Ergänzungsheft No. 140. Gotha: Justus Perthes, 1902. *Presented by the Publishers.*

Asia Minor. **Kiepert.**

Karte von Kleinasien. Scale 1 : 400,000 or 6·3 stat. miles to an inch. Von Dr. Richard Kiepert. Sheet B. V., Siwas. Berlin: Dietrich Reimer (Ernst Vohsen), 1902. *Price 6 marks.*

There are now altogether nine sheets of this map published out of the twenty-four of which it will consist when complete. The present sheet includes the area between 38° 50′ and 40° 40′ N. lat., and 36° 20′ and 39° 30′ E. long. It is in every respect similar, as regards style of production, to those previously published, the hill work being in brown, with the lettering, roads, and rivers in black.

China. **Madrolle and Baille.**

Atlas de l'Empire Chinois. Par Cl. Madrolle et A. Baille. Scale 1 : 3,000,000 or 47·3 stat. miles to an inch. Sheets: Canton, Peking. Paris, 1900–1901. *Price 1.50 fr. each sheet.*

It has been attempted to give a good deal of information on these sheets, notwithstanding their comparatively small scale (1 : 3,000,000) and somewhat rough appearance. They show the territories conceded to European power, ports open to foreign commerce, mission stations, lighthouses, limit of the navigability of rivers, altitudes, the character and relative importance of Chinese cities and towns, canals, railways, steamers, and telegraph lines, and other information. There is also an inset showing the languages of Southern China.

Japan. **Yamasaki.**

Tiefenkarte des japanischen Binnenmeeres Setouchi. Von Dr. N. Yamasaki. Scale 1 : 600,000 or 9·4 stat. miles to an inch. *Petermanns Geographische Mitteilungen*, Jahrgang 1902, Taf. 20. Gotha: Justus Perthes. *Presented by the Publisher.*

AFRICA.

Africa. **Intelligence Division, War Office.**

Africa. Scale 1 : 1,000,000 or 15·7 stat. miles to an inch. Sheet 88, Juba river. London: Intelligence Division, War Office. Stanford. *Price 2s. Presented by the Director-General of Mobilization and Military Intelligence.*

Africa. **Niox.**

G. Niox. Atlas de Géographie Général. Afrique. Fascicule spécial de cinq feuilles. No. 26, Afrique d' ensemble, scale 1 : 16,000,000 or 252·5 stat. miles to an inch; No. 23, Algérie et Tunisie, scale 1 : 2,000,000 or 31·5 stat. miles to an inch;

No. 23bis, Région saharienne française, scale 1 : 4,000,000 or 63·1 stat. miles to an inch; No. 24, Senegal-Niger, scale 1 : 8,000,000 or 126·2 stat. miles to an inch: No. 24bis, Congo-Nil, scale 1 : 8,000,000 or 126·2 stat. miles to an inch. Paris: Ch. Delagrave, 1903. *Price 6 fr. Presented by the Publisher.*

In addition to a general map of Africa on the scale of 1 : 16,000,000, there are contained in the same cover four other maps of different parts of the continent, viz. Senegal-Niger region; Algeria and Tunis; French Sahara; and Central Africa, Upper Nile and Congo region. These maps, somewhat roughly executed, are coloured to show territorial possessions and spheres of influence, but the Transvaal and Orange River Colony are shown as independent states. The maps are on larger scales than those of most general atlases. Other parts will be published later.

Africa. **Service Géographique de l'Armée, Paris.**

Carte d'Afrique. Scale 1 : 2,000,000 or 31·6 stat. miles to an inch. Sheet: 8, Le Caire. Service Géographique de l'Armée, Paris. *Price 1 fr.*

This sheet is a new edition revised and corrected up to 1901. Situated as it is at the extreme north-east corner, it serves well to show the great distortion in the configuration of the land produced by using the orthographic projection, which was, for some remarkable reason, chosen for this map. There are inset plans of Alexandria, Cairo, Port Said, Suez, and Ismailia.

Somaliland. **Intelligence Division, War Office.**

Map of a portion of Somaliland. Scale 1 : 1,000,000 or 15·7 stat. miles to an inch.

London: Intelligence Division, War Office, 1902. *Price 3s. Presented by the Director-General of Mobilization and Military Intelligence.*

This map has been prepared in connection with the present military operations in Somaliland, and consists of parts of sheets 68 N.W., 69 N.E., 80 S.W., 81 S.E. of the Intelligence Division 1 : 1,000,000 map of Africa. It includes the region from Berbera on the north to just below Bari on the Webi Shebeli on the south, and from Hargeisa on the west to the meridian of 50° 30′ E. on the east.

Somaliland. **Stanford.**

Map of the British Somali Coast Protectorate. Scale 1 : 1,000,000 or 15·7 stat. miles to an inch. London: Edward Stanford, 1902. *Price 5s. Presented by the Publisher.*

Includes the region between 6° and 11° 40′ N. lat. and 42° 20′ and 50° E. long. It thus shows British Somaliland, the Ogaden country, and a part of the Italian protectorate on the east coast, and will serve to illustrate the scene of the present military operations.

Tunis. **Service Géographique de l'Armée, Paris**

Tunisie. Scale 1 : 100,000 or 1·5 stat. mile to an inch. Sheet No. XXV., Jana. Paris: Service Géographique de l'Armée. *Price 1.20 fr.*

AMERICA.

Canada. **Turnbull.**

Map showing exploration between Lakes Winnipeg, Manitoba, and Winnipegosis. Scale 1 : 380,160 or 6 stat. miles to an inch. To accompany the report of Thos. Turnbull, D.L.S., dated February 9, 1901, in the 'Annual Report of the Department of the Interior for 1901.' Ottawa, 1901. *Presented by the Surveyor-General of Canada.*

Canada. **White-Fraser and Saint Cyr.**

Map of the Country adjacent to the 60th parallel of latitude from Teslin lake to Alsek river. Scale 1 : 380,160 or 6 stat. miles to an inch. To accompany reports of George White-Fraser, and Arthur Saint Cyr, in the 'Annual Report of the Department of the Interior for 1901.' Ottawa, 1901. *Presented by the Surveyor-General of Canada.*

Guatemala. **Bureau of the American Republics, Washington.**

Guatemala from official and other sources. Prepared in the Bureau of the American Republics. William Woodville Rockhill, Director. Compiled and drawn by M. Hendges. Scale 1 : 792,000 or 15·2 stat. miles to an inch. Washington, D.C., 1902. *Presented by Colonel G. E. Church.*

A useful general map of Guatemala, indicating in red letters the approximate location of twenty-two different minerals throughout the country. A good deal of other information concerning ports, means of communication, lights, etc., is given.

Paraguay. **Idiaquez.**

Mapa de la frontera con el Paraguay. Formado por Eduardo Idiaquez, Ing. de Limites. Scale 1 : 2,900,000 or 45·7 stat. miles to an inch. La Paz: La Direccion de Limites, 1902. *Presented by the Oficina Nacional de Inmigracion, Estadistica, La Paz.*

This map includes the region of the Gran Chaco, lying between the Pilcomayo and Paraguay rivers, and shows in various symbols the various boundaries between Bolivia and Paraguay according to the claims of the two countries and different treaties. A clear explanation is given of the various signs employed to indicate the different lines. The routes of the expeditions of Dr. Campos and A. Thouar are also given.

United States. **Rand, McNally & Co.**

Indexed County and Township Pocket Map of Minnesota. Scale 1 : 1,013,760 or 16 stat. miles to an inch. New edition, 1902. *Price* $0.25.—Vest Pocket Map of Michigan. Northern: Scale 1 : 1,013,760 or 16 stat. miles to an inch: Southern: Scale 1 : 760,320 or 12 stat. miles to an inch. *Price* $0.15 *each*. Chicago and New York: Rand, McNally & Co., 1902. *Presented by the Publishers.*

ATLANTIC OCEAN.

Atlantic Ocean. **Neumayer.**

Deutsche Seewarte. Atlantischer Ozean. Ein Atlas von 39 Karten, die physikalischen Verhältnisse und die Verkehrs-Strassen darstellend, mit einer erläuternden Einleitung und als Beilage zum Segelhandbuch für den Atlantischen Ozean. Zweite Auflage. Herausgegeben von der Direktion. Hamburg: L. Friederichsen & Co., 1902. *Presented by Prof. G. Neumayer.*

POLAR REGIONS.

North Polar Region. **Isachsen.**

Übersichtsskizze der von der Norwegischen Fram-Expedition 1898–1902, erforschten Polargebiete. Von Gunnar Isachsen. Scale 1 : 6,000,000 or 94·6 stat. miles to an inch. *Petermanns Geographische Mitteilungen*, Jahrgang, 1902. Taf. 21. Gotha: Justus Perthes. *Presented by the Publishers.*

GENERAL.

Ancient Geography. **Kiepert.**

Formæ Orbis Antiqui. 36 Karten im Format von 52 : 64 cm. mit Kritischen Text und Quellenangabe zu jeder Karte. No. xxiii. Italia Superior cum Regionibus Alpinis. Mit. 11 Seiten Text. Ergänzt und herausgegeben von Richard Kiepert. Berlin: Dietrich Reimer (Ernst Vohsen), 1902. *Price* 3 *marks.*

The present part of this atlas of ancient geography contains Sheet xxiii., Northern Italy and the adjacent Alpine countries, with eleven pages of letterpress, descriptive and critical, which gives also the authorities consulted in the construction of the maps. There are now altogether nine sheets published out of the thirty-six of which the complete atlas will consist when finished.

German Colonies. **Sprigade and Moisel**

Grosser Deutscher Kolonialatlas. Bearbeitet von Paul Sprigade und Max Moisel. Herausgegeben von der Kolonial-Abtheilung des Auswärtigen Amts Lieferung 2. Die deutschen Besitzungen im Stillen Ocean und Kiautschou. Berlin: Dietrich Reimer (Ernst Vohsen), 1902. *Presented by the Publisher.*

The first part of this atlas of the German colonies was published in 1902, and noticed in the *Geographical Journal* for January, 1902. This second part contains the following maps: No. 26, German New Guinea (western sheet); No. 27, German New Guinea (eastern sheet); No. 28, The Ladrones and Marshall Islands. The first two are on the scale of 1 : 2,000,000, and the third on that of 1 : 3,000,000. After the map is an index to the names on the map of the Kameruns, which appeared in the first part. The maps are well drawn and printed in colours. Insets are given on enlarged scales of important bays and harbours.

World. **Bureau International des Administrations Telegraphiques, Bern.**

Carte des Communications Télégraphiques due Régime Extra-Européen, dressée d'après des documents officiels par le Bureau International des Administrations Télégraphiques. Scale 1 : 20,997,504 or 331·4 stat. miles to an inch. 4 Sheets. Bern: Bureau International des Administrations Telegraphiques, Bern, 1902.

This is a map of the World on Mercator's projection, in four sheets, each measuring

17¼ × 28¾ inches, upon which the telegraph lines, both overland and submarine, are shown in black. Boundaries of the various countries are shown in red, and the water is tinted blue.

World. **Rinaudo.**

Prof. Costanzo Rinaudo. Atlante Storico per el Scuole Secondarie. Parte Prima. Il Mondo Antico. 19 Carte e Repertorio di titti i nomi. Disegni di Domenico Locchi. Turin: G. B. Paravia & Co., 1902. *Presented by the Publishers.*

This is the first part of a little general atlas specially prepared for the use of Italian secondary schools. It contains nineteen maps and plans dealing with ancient geography. These have been drawn by Domenico Locchi from reliable authorities, and printed in colours. They are accompanied by letterpress and an alphabetical index to place-names.

World. **Stieler.**

Neue, neunte Lieferungs-Ausgabe von Stieler's Hand-Atlas, 100 Karten in Kupferstich. 11, 12, 13, and 14 Lieferung. Gotha: Justus Perthes. *Price 60 pf. each part.*

Parts 11 and 12 (in one) contain: No. 42, South Scandinavia, 1:2,500,000, by C. Scherrer; No. 79, S.W. sheet of a four-sheet map of Australia in four sheets, 1:5,000,000, by Dr. H. Haack; Nos. 88 and 90, United States, sheets 3 and 5, 1:3,700,000, by H. Habenicht.—Parts 13 and 14 (in one): No. 13, Thuringian States, 1:500,000, by C. Scherrer and O. Koffmahn; No. 65, Japan, Korea, and Eastern China, 1:7,500,000, by C. Barich; Nos. 87 and 89, United States, sheets 2 and 4, 1:3,700,000, by H. Habenicht.

CHARTS.

North Atlantic Ocean and Mediterranean Sea. **Meteorological Office, London.**

Pilot Chart of the North Atlantic and Mediterranean for January, 1903. London: Meteorological Office. *Price 6d. Presented by the Meteorological Office, London.*

United States Charts. **United States Hydrographic Office.**

Pilot Chart of the North Atlantic Ocean for December, 1902; and of the North Pacific Ocean for January, 1903. U.S. Hydrographic Office, Washington, D.C. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

Burma, Siam, etc. **Rigby and Armstrong.**

Eighty-four photographs taken during a journey in 1899–1900 from Moulmein to Hanoi by Captains Rigby and Armstrong. *Presented by Captain G. C. Rigby.*

The route followed by Captains Rigby and Armstrong, during which these photographs were taken, was from Moulmein to Pupun, thence to Mong Haut, in Siam, crossing the Selwin at Dagwin Ferry, and on to Cheng-hai; hence to Ssumao, in south Yunnan, Puerh, Mong Lieh, Manhao, on the Red river, Mong-tsu, Kai-hua fu, Hagiang, and thence on to Hanoi in Tongking. A great part of the country traversed is very imperfectly known, and the photographs, though small, are thus important.

(1) On the Yonzalin river, Burma; (2) Unloading the elephants on the banks of the Salwin river, Dagwin ferry; (3) South gate of Mainglungyi, Siam; (4 and 5) Elephant transport: a bad bit of road between Mainglungyi and Mong-haut; (6) On the Meping river, Siam; (7) Siamese boats, Meping river; (8) Irrigation water-wheel, Meping river; (9) A Siamese "Wût," or temple; (10) Camp at Mechali: a rest-house; (11) Laos on the march; (12) House of Dr. Denman (American missionary), Cheng-hai; (13) Miaotsu people at Cheng-hai; (14) Natives of Ta-si-lek village in S. Shan State of Keng-tung; (15) Akkos at Mong-lin, S. Shan States; (16) Akko girl, Monglin; (17 and 18) Leu women, Mong-Yawn; (19) Mekong river, near Paliao, S. Shan States; (20) At Mong-Yawn fair; (21) A jungle camp; (22) View down Mekong river, near Mongham ferry; (23) Shan girls on trek; (24) The Panthai mule-saddle; (25) A midday halt; (26) "Wût" at Tapun in Keng-hung, Chinese Shan States; (27) A Keng-hung village; (28) Shan women; (29) Shan Talôk women; (30) Camp at Tu-ko-Chai in hills south of Ssumao; (31) Puteng valley, south of Ssumao; (32) Chinese Imperial Customs building, Ssumao; (33) West gate of Ssumao; (34) South gate and street, Ssumao; (35) Cotton caravan outside the custom-house, Ssumao; (36) The "Ting" (magistrate) of Ssumao returning from a visit to the custom-house; (37)

Market, Ssumao; (38) Street and roofs in Ssumao; (39) Shans at the market, Ssumao; (40) Hill people near Ssumao; (41) A refreshment stall in the market, Ssumao; (42) Main street, Ssumao; (43) Spring procession, Saumao (soldiers); (44 and 47) Spring procession; (45) Spring procession, soldiers and bannermen; (46) The "Ting" of Ssumao in spring procession; (48 and 52) Procession of the gods, Ssumao, takes place annually in January; (49) A car in the procession of the gods; (50) A car supporting little boys dressed up as angels; (51) Some of the gods; (53) Soldiers in procession of the gods; (54) Procession of gods: car with angels; (55) God of war in procession; (56) Paddy-fields, Nakoli; (57) Bridge on road from Ssumao to Puerh; (58) Terraced paddy-fields, Mong-hsien; (59) Nape valley; (60) A valley on the Puerh—Mong-lieh route; (61) Man-pung-tien valley; (62) Mong-lieh valley; (63) Mong-lieh village; (64) On the road to Chi-ma-pa; (65) Our escort from Mong-lieh; (66) A Chi-ma-pa girl; (67) Automatic grain-husker worked by water; (68) Terraced paddy-field; (69) Apachai women; (70) Wuni women; (71) Manhao on Red river; (72) A Shan-chai valley; (73) Rocky country above Yaoto; (74) Native of S. Yunnan; (75) On the road to Matang; (76) Rocky country on road to A-la-shu; (77) Temple on road to Kai-hua-fu; (78) On the road near Kai-hua-fu; (79) The Clear river near Kai-hua-fu; (80) Bridge on road to Sinkai, S. Yunnan; (81) Street Shue-li-kai; (82) Chinese in Shue-li-kai; (83) Ma-li-po; (84) My Chinese interpreter.

Faröe Islands. **Hepburn.**

One hundred photographs of the Faröe Islands, taken by David Hepburn, Esq., 1901–1902. *Presented by David Hepburn, Esq.*

These photographs have been selected from a large number taken during two visits to the Feröe Islands in 1901–1902. Considering the frequency of sea-fogs and general unfavourable meteorological conditions which prevailed at the time of his visits, Mr. Hepburn may be congratulated upon the results he has obtained, many of the photographs being extremely good. They are platinotype prints. The titles are as follows:—

Stromö island:—(1) Thorshavn, the capital; (2) South harbour, Thorshavn; (3) The bridge, Thorshavn; (4) The hotel, Thorshavn; (5) Fishing-boats, Thorshavn; (6) Landing-stage, Thorshavn; (7) Whale's jaw gate, Thorshavn; (8 and 9) Streets, Thorshavn; (10) A fisherman's funeral, Thorshavn; (11) The doctor's house and pony, Thorshavn; (12) Evening, Thorshavn; (13) The outskirts of Thorshavn; (14) The Kongebroc, Thorshavn; (15) The British Consulate; (16) The British Consul in his boat; (17–19) The north harbour, Thorshavn; (20) Frudriks vaag, Thorshavn; (21) A group of boys and pony, Thorshavn; (22) King Oscar's monument, Thorshavn; (23) Wool drying in a street, Thorshavn; (24) The Skerry rocks off Hoyvig; (25) Vestmanhavn, Whale bay; (26) Coast at Hoyvig; (27) Bird Cliffs at Norderdahl; (28) Cairn on road to Velbistad; (29) Kalback church; (30) River near Kalbak; (31) The coast near Thorshavn; (32) The fort, Thorshavn; (33) Saudegjerde river; (34) Saudegjerde river lower down; (35) Soudegjerde river near mouth; (36) Distant view of the island of Kolter; (37) Faröese boy; (38) Women carrying peat; (39) Faröese boys; (41) A peat-gatherer; (42) Photograph from model of Faröese boat; (43) Faröese boatmen; (44) Faröese fisherfolk; (45) Faröese children; (46) Woman dyeing cloth; (47) Cleaning fish; (48) Farm Kirkebö; (49 and 50) Ruins of monastery, Kirkebo; (51) Ancient log house, Kirkebo; (52) Boat houses, Kirkebo; (53) Going to church, Kirkebo; (54) The church, Kirkebo; (55) Farm house and church gate, Kirkebo; (56) A Faröese from Kirkebo; (57) The trading steamer *Smirel;* (58) The whaler *Selvik;* (59) On board the *Selvik;* (60) Harpoon gun of the *Selvik;* (61) Kollefiord; (62) A haul of Seythe; (63) Drying fish on housetops; (64) Drying fish on rocks; (65) Stacking fish; (66) Cutting up whale flesh. Syderö island:—(67) Women carrying fish, Trangjisvaag; (68) Fish drying on rocks, Trangjisvaag; (69) Rocks above Trangjisvaag; (70) Cave at Trodboe, near Trangisjvaag. Osterö island:—(71) Skjaale; (72) Strender, disembarking pony; (73) Landing at Funding; (74) A Faröese on bridge near Funding; (75) Funding Fiord from Slettaratinde; (76) On the slopes of Slettaratinde; (77) The summit of Slettaratinde; (78) On the summit of Slettaratinde; (79 and 80) Neighbouring peaks, from Slettaratinde; (81) Lake above Eide, from Slettaratinde; (82) Slettaratinde (summit not in view); (83) Eide; (84) Leaving Eide. Nolsö:—(85) Southern extremity of Nolsö; (86) The "eye of the needle," natural arch; (87) Haymaking; (88) Nolsö Eide; (89) Boat and crew entering a cave; (90) Nolsö. Vaagö Island:—(91) Midvaag, Whale bay; (92) The "Witch's Finger;" (93) The "Witch's Finger," front view; (94) The base of the "Witch's Finger." Bordo island:—(95) Rocks above Klaksvig; (96) Pinnacle near the summit of Klak; (97) From Klak, looking south; (98) Kalsö fiord, from Klak. Kalsö island:—(99) Mydledal; (100) Northern extremity of Kalsö, from sketch.

Persia. **Witherby.**

Thirty-six photographs of South-Western Persia, taken by H. F. Witherby, Esq. *Presented by H. F. Witherby, Esq.*

These photographs were taken by Mr. Witherby during his journeys between Bushire and Shiraz. He has divided them into three sections, the first, Nos. 1 to 11, illustrating the country traversed from Bushire to Shiraz; the second, Nos. 12 to 29, the return journey to Bushire, which was by a different route, and the third, Nos. 30 to 36, photographs of the inhabitants. The following is a list of the titles:—

(1) Landing from ship at Bushire; (2) Bridge over the Daliki river between Bushire and Shiraz; (3) Mian Kotal; (4) Kotal Pei-i-Zun, between Bushire and Shiraz; (5) An Iliyat camp, from Shahpur Shahr; (6) Dasht-i-Bam; (7) Camp in the Dasht-i-Bam; (8) An oak tree in the Dasht-i-Bam; (9) Northern end of Dasht-i-Bam, near Naksh-i-Bahram; (10) Shul river, Tang-i-Giro; (11) View over the Tang-i-Giro; (12) Iliyat camp near Aliabad, near Ardakun; (13) Ardakun, north-west of Shiraz; (14) Camp between Ardakun and Kuh-i-Dinar; (15) On the way to Kuh-i-Dinar from Ardakan; (16) Kuh-i-Dinar from the east side, Iliyats in foreground; (17) Kuh-i-Dinar from the east; (18) Gardan-i-Bijan, the pass over the Kuh-i-Dinar; (19) A piece of the track over Kuh-i-Dinar; (20) A snow-slope on east side of Gardan-i-Bijan; (21) Kuh-i-Dinar from near Sisakht, on its western slope; (22) View to south-east near Sisakt, on west side of Kuh-i-Dinar; (23) Iliyats travelling over the Gardan-i-Bijan, Kuh-i-Dinar; (24) Kuh-i-Dinar from the west; (25) Near Sisakt; (26) Khersun river, west side of Kuh-i-Dinar; (27) In the oak woods on western side of Kuh-i-Dinar; (28) "Tang," near Bijo, south-west of Kuh-i-Dinar; (29) At the bottom of a "tang" near Bijo; (30) Thrashed corn near Nurabad; (31) Shikari with old gun with cudgel-shaped stock near Basht; (32) Tent of Abdullah Khan, chief of Farsi Medun Iliyats, in Po Dinar; (33) Visitors near Naksh-i-Bahram, Dasht-i-Bam; (34 and 36) Dolatiori Iliyats at Bijo, near Basht; (35) A typical Iliyat.

Upper Nile. **Crispin.**

Eighteen photographs of the Nuer Country, and the Sudd of the White Nile. By E. S. Crispin, Esq., M.R.C.S., L.R.C.P. *Presented by E. S. Crispin, Esq., M.R.C.S., L.R.C.P.*

Dr. Crispin's photographs form an interesting little set, both as illustrating the types of natives and the remarkable sudd blocks, which have for so long impeded navigation on the upper Nile and its tributaries. The following are the titles:—

(1) Shilluks in dug-out canoe, Sobat river; (2) Dinka dance, Gobjak, on the Sobat river; (3) Shol-Ajik; (4) Two fine bullocks belonging to Nuers; (5) Tusks and pyramid at Keik; (6) Denkur's capital, Keik, pyramid in centre; (7) Bugler, 10th Sudanese; (8) Detachment of 10th Sudanese at Shitt; (9) A general view of newly opened channel through sudd, with small sudd across it; (10) Camp on piece of true river-bank in the sudd; (11) Men landing from the bows of the steamer on to a sudd-block with its top growth of papyrus; (12) Men on sudd-block clearing the top growth; (13) Top growth cut down and sudd-block cut into sections; (14) Steamer towing out block of sudd, men standing round and holding the hawser in position; (15) Steamer towing out sudd-block; (16) Block towed out into open water, much diminished in size during its journey, partly by compression and partly by the front edge rolling under; (17) Sudd-block let go in open water, floating down stream; (18) Camp on hard ground in sudd.

Vladivostock.

Panorama of Vladivostok harbour and town. *Presented by Captain F. C. Mullan.*

This panorama is in five parts, each of which consists of a very clear print from a full-size plate. It is the production of a local Russian photographer.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

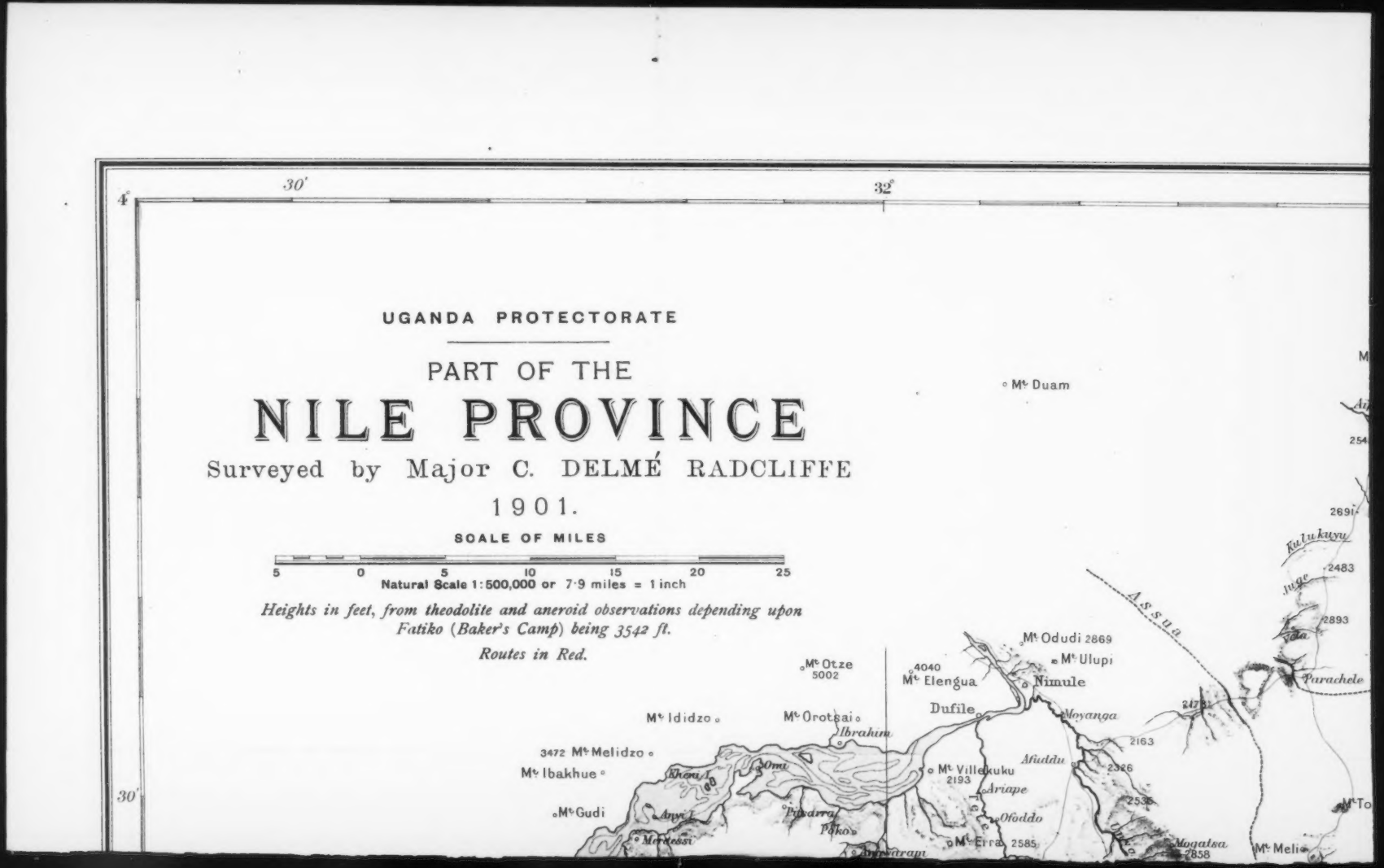
112
110
108
106
104
102
32
30
28
U N I T E D S T A T E S
Deming
El Paso
Paso del Norte
Hisbe
Fronteros
PIMA ALTO
APACHE
Ascension
Corralitos
Casas Grandes
San Diego
Gallego
OPATA
SERI
Hermosillo
Guaymas
Chihuahua
Piedras Negras
Eagle Pass
TOBOSO
Cusihuiriachic
Yepomera
Rio Grande
Rio Conchos
Rio Yaqui
Rio Sonora
Gulf of California
LOWER CALIFORNIA
PACIFIC
115°
30°
25°

110°
105°
100°
95°
90°
U N I T E D S T A T E S
Tucson
Austin
New Orleans
30
SONORA
CHIHUAHUA
Chihuahua
Guaymas
Galveston
Rio Grande
COAHUILA
GULF OF
MEXICO
Monterey
NUEVO LEON
Saltillo
25
Culiacan
DURANGO
Durango
SINALOA
Tropic of Cancer
Victoria
TAMAULIPAS
ZACATECAS
Zacatecas
SAN LUIS POTOSI
Tampico
Aguas Calientes
JALISCO
GUANA
Merida

Modified Conical Equal-Area Projection (Bonne's)

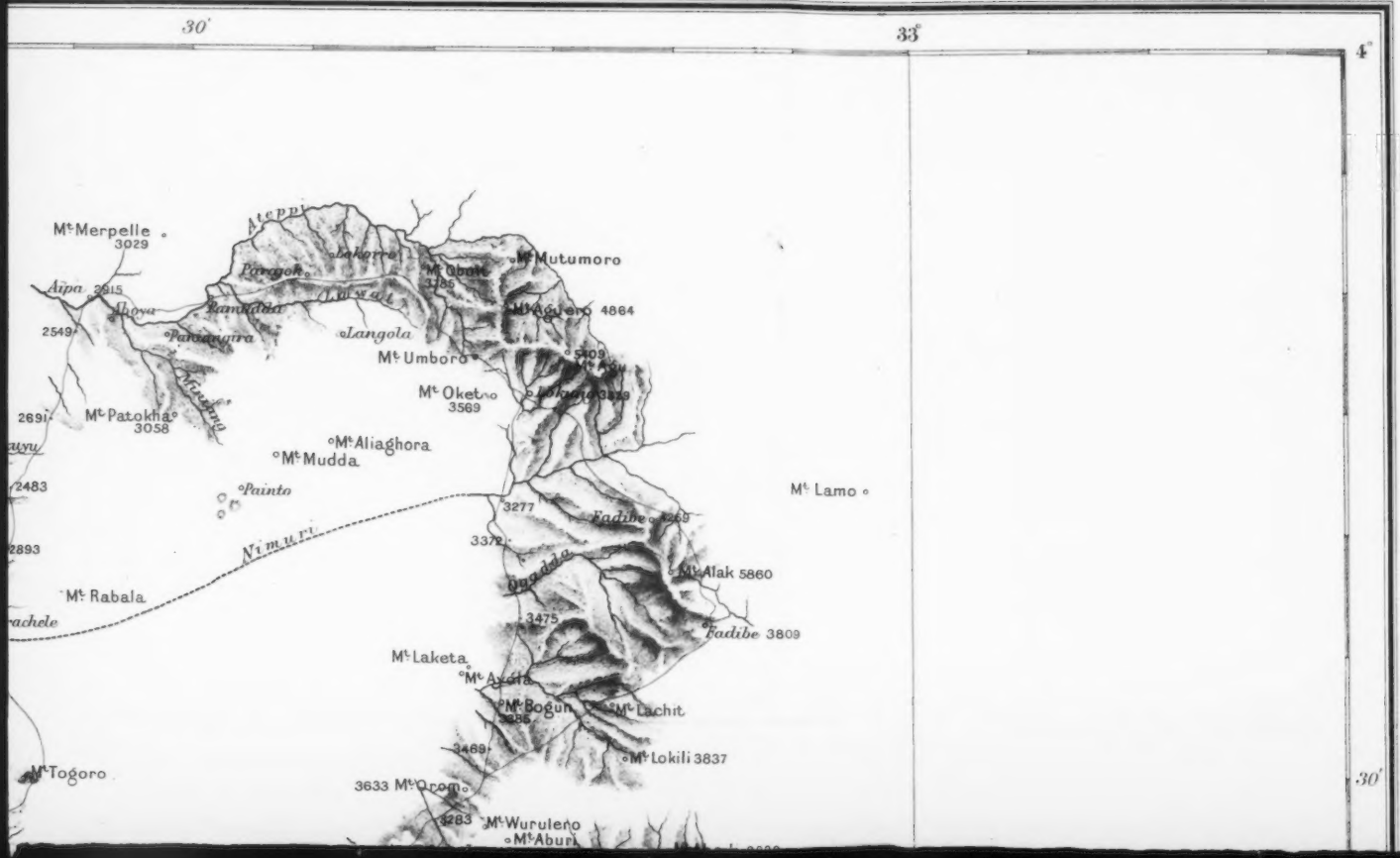
Published by the Royal Geographical Society.

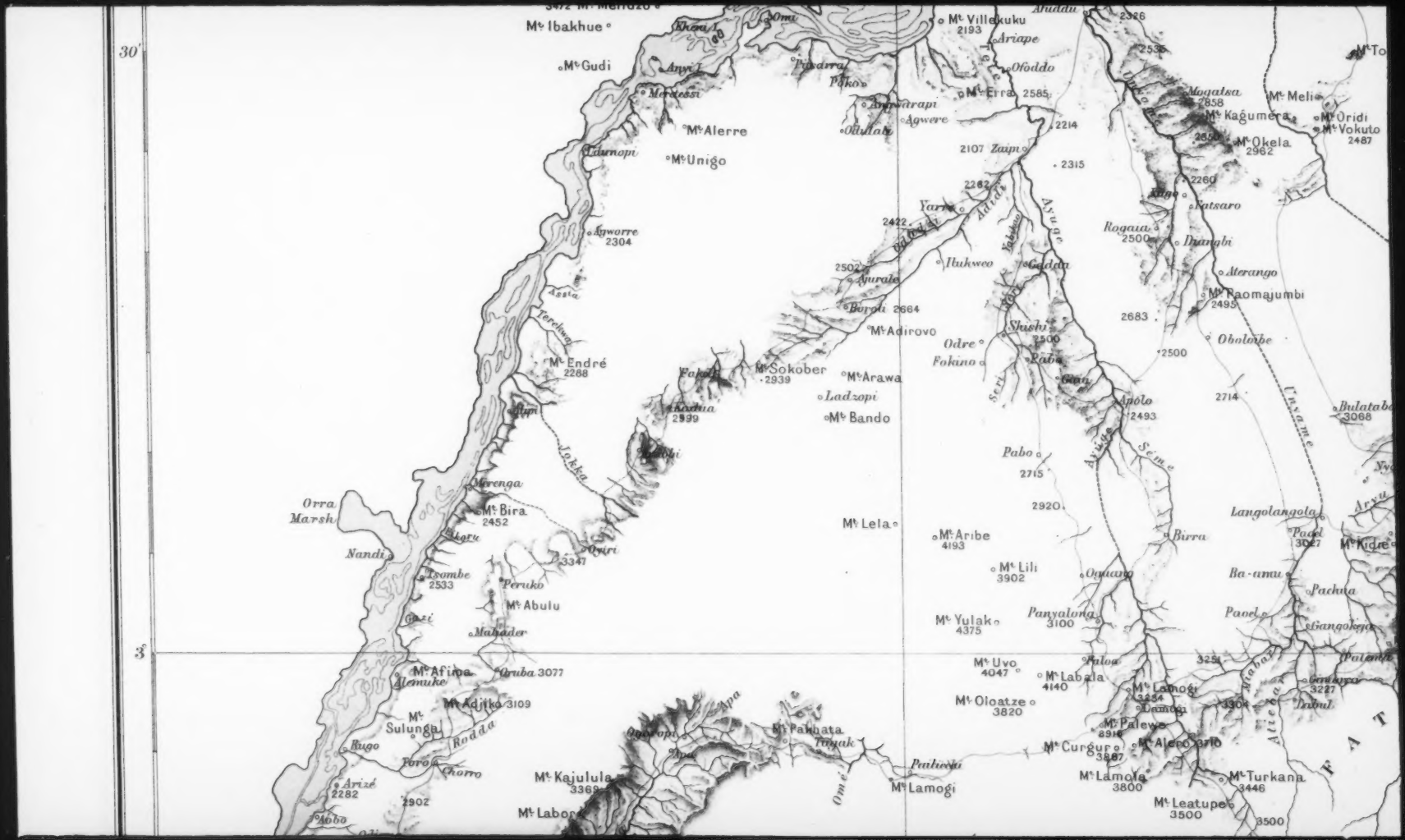
MEXICO.
Showing states & principal railways
Scale of Miles.
0 100 200 300
Nat. scale 1: 20,000,000 or 316 miles to 1 inch.
GULF OF MEXICO
Tropic of Cancer
Gulf of Campeche
Tampico
Tuxpan
Misantla
Zempoala
Jalapa
Vera Cruz
Taxcala
Puebla
Orizaba
Fronteras
Carmen
Comalcalco
Palenque
Piedras Negras
Mencha
Cuicatlan
Tehuantepec
R. Verde
Oaxaca
Zacatula
Xoxo
Cuilapa
Ejutla
Tehuantepec
MEXICANO
ISTHMUS OF TEHUANTEPEC
GUATEMALA
HONDURAS
SALVADOR
YUCATAN
CAMPECHE
TABASCO
CHIAPAS
OAXACA
GUERRERO
MICHOACAN
MEXICO
PUEBLA
VERA CRUZ
TLASCALA
MORELOS
JUAN HIDALGO
Morelia
Colima
Campeche
Gulf of
OCEAN
98
96
94
92
90
24
22
20
18
16
15
20°
30°

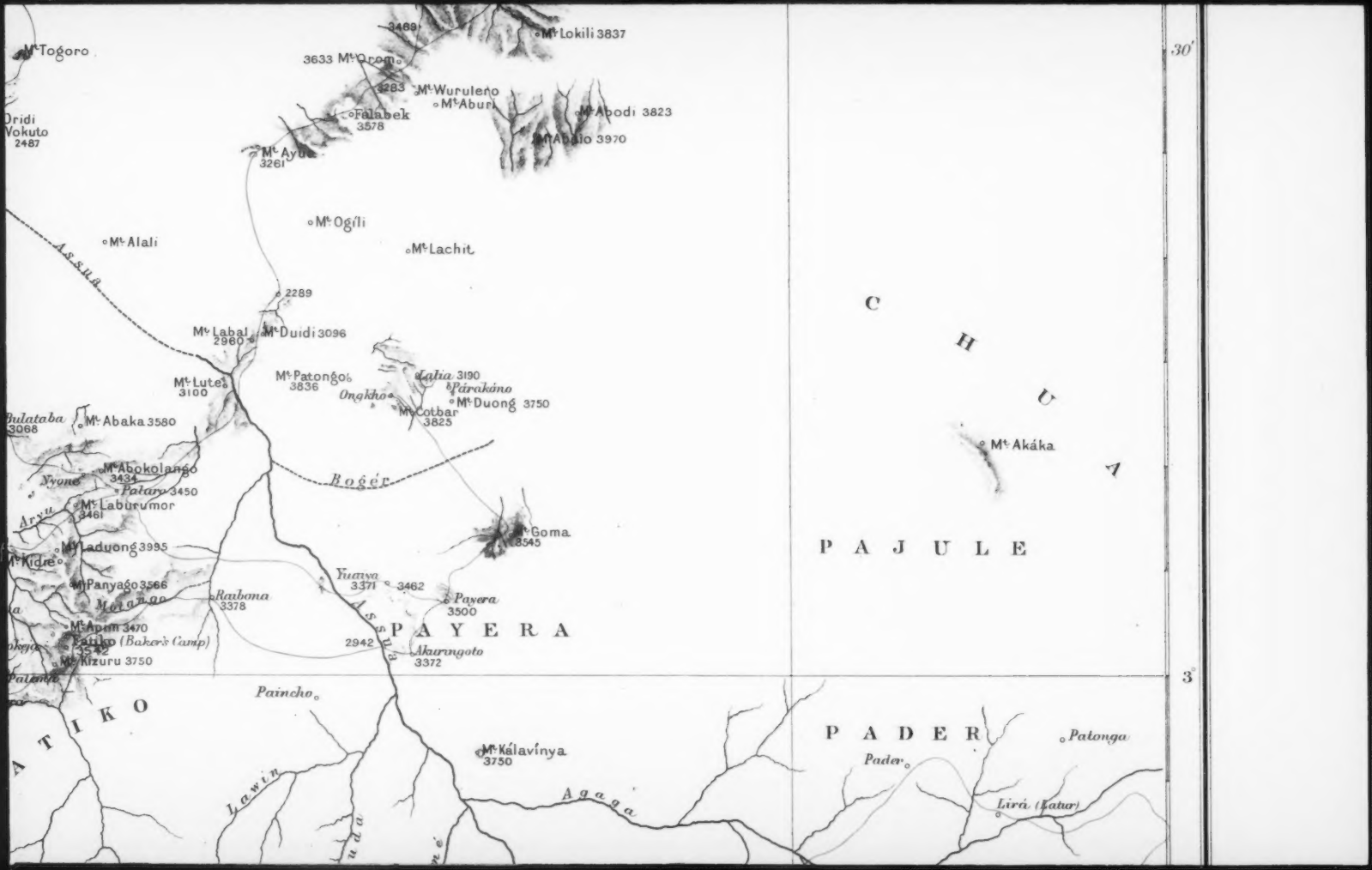

UGANDA PROTECTORATE
PART OF THE
NILE PROVINCE
Surveyed by Major C. DELMÉ RADCLIFFE
1901.
SCALE OF MILES
5 0 5 10 15 20 25
Natural Scale 1:500,000 or 7·9 miles = 1 inch
Heights in feet, from theodolite and aneroid observations depending upon Fatiko (Baker's Camp) being 3542 ft.
Routes in Red.
4°
30'
32°
30'
Mt. Duam
Mt. Otze 5002
4040 Mt. Elengua
Mt. Odudi 2869
Mt. Ulupi
Nimule
Dufile
Moyanga
Mt. Ididzo
Mt. Orotsai
Ibrahim
3472 Mt. Melidzo
Mt. Ibakhue
Mt. Gudi
Mt. Villekuku 2193
Afuddu
Ariape
Ofoddo
Mt. Erra 2585
Mogatsa 2858
Mt. Meli
Parachele
Assua
Kulukuyu
Juge
2483
2893
2691
2163
2326
2535
2178
Mt. To

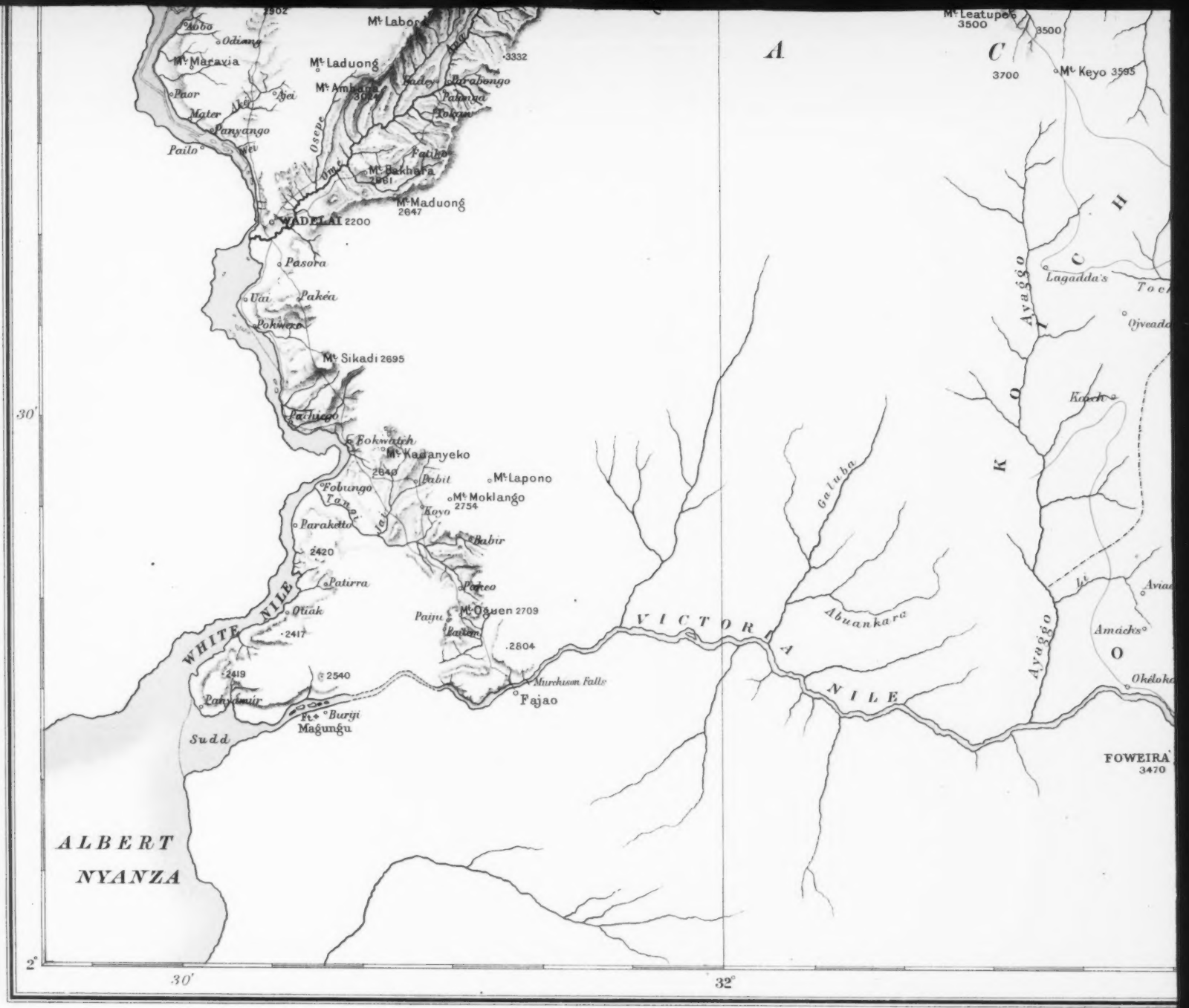
PART OF THE NILE PROVINCE.

DELMÉ RADCLIFFE.




30'
3°
Mt Ibakhue
Mt Gudi
Mt Alerre
Mt Unigo
Mt Endré 2288
Mt Bira 2452
Mt Abulu
Mt Afiba
Mt Aditka 3109
Mt Sulunga
Mt Kajulula 3369
Mt Labor
Mt Sokober 2939
Mt Arawa
Mt Bando
Mt Adirovo
Mt Lela
Mt Aribe 4193
Mt Lili 3902
Mt Yulak 4375
Mt Uvo 4047
Mt Oloatze 3820
Mt Labala 4140
Mt Lamogi 3434
Mt Palewo 8918
Mt Curgur 3887
Mt Alepo 3710
Mt Lamola 3800
Mt Turkana 3446
Mt Leatupe 3500
Mt Villekuku 2193
Mt Erra 2585
Mt Kagumera
Mt Okela 2962
Mt Oridi
Mt Vokuto 2487
Mt Meli
Mt Raomajumbi 2495
Mt Kidre
Mt To
Orra Marsh
Nandi
Peruko
Mahader
Oruba 3077
Rugo
Foro
Chorro
Arizé 2282
Mobo
Omo
Kibish
Ajumani
Ibakhue
Omo I
Gudi
Mareessi
Alerre
Unigo
Asoworre 2304
Asela
Terekwel
Lake Rudolf
Lokitaung
Kalokol
Lodwar
Kerio
Lokichar
Kapedo
Kainuk
Kitale
Eldoret
Kapenguria
Kacheliba
Lokichogio
Nakuru
Nairobi
Kisumu
Kisii
Kericho
Kakamega
Busia
Eldama Ravine
Nyahuru
Nyeri
Nanyuki
Meru
Embu
Kitui
Machakos
Kajiado
Namanga
Voi
Mombasa
Malindi
Lamu
Garissa
Wajir
Mandera
Moyale
Marsabit
Isiolo
Maralal
Samburu
Laikipia
Baringo
Elgeyo
Turkana
Pokot
Karamoja
Uganda
Ethiopia
Somalia
Tanzania
Lake Victoria
Lake Turkana
Lake Baringo
Lake Bogoria
Lake Nakuru
Lake Naivasha
Lake Elmenteita
Lake Magadi
Lake Amboseli
Lake Jipe
Lake Chala
Mount Kenya
Aberdare Range
Cherangani Hills
Mau Escarpment
Loita Hills
Chyulu Hills
Ngong Hills
Nyambeni Hills
Mathews Range
Ndoto Mountains
Huri Hills
Hurri Hills
Kulal
Nyiro
Ol Doinyo Sabuk
Kilimanjaro
Meru
Amboseli
Tsavo
Arusha
Moshi
Taveta


Mt Togoro
3469
Mt Lokili 3837
3633 Mt Orom
3283 Mt Wuruleño
Mt Aburi
Mt Abodi 3823
Falabek 3578
Mt Abalio 3970
Dridi
Vokuto
2487
Mt Ayuo 3261
Mt Ogili
Mt Alali
Mt Lachit
Assua
2289
Mt Labal 2960
Mt Duidi 3096
Mt Lute 3100
Mt Patongo 3836
Lalia 3190
Parakano
Ongkho
Mt Duong 3750
Mt Cobar 3825
Bulataba 3068
Mt Abaka 3580
Mt Abokolango 3434
Yyone
Pataro 3450
Mt Laburumor 3461
Aryu
Mt Laduong 3995
Mt Kidre
Mt Panyago 3566
Raibana 3378
Mt Apim 3470
Kafuko (Baker's Camp) 3542
Mt Kizuru 3750
Patanke
Goma 8545
Yuanya 3371
3462
Payera 3500
Akuringoto 3372
2942
PAYERA
Paincho
ATIKO
Mt Kalavinya 3750
Lawin
Agaga
C H U A
Mt Akáka
PAJULE
PADER
Patonga
Pader
Lirá (Latur)
30'
3°



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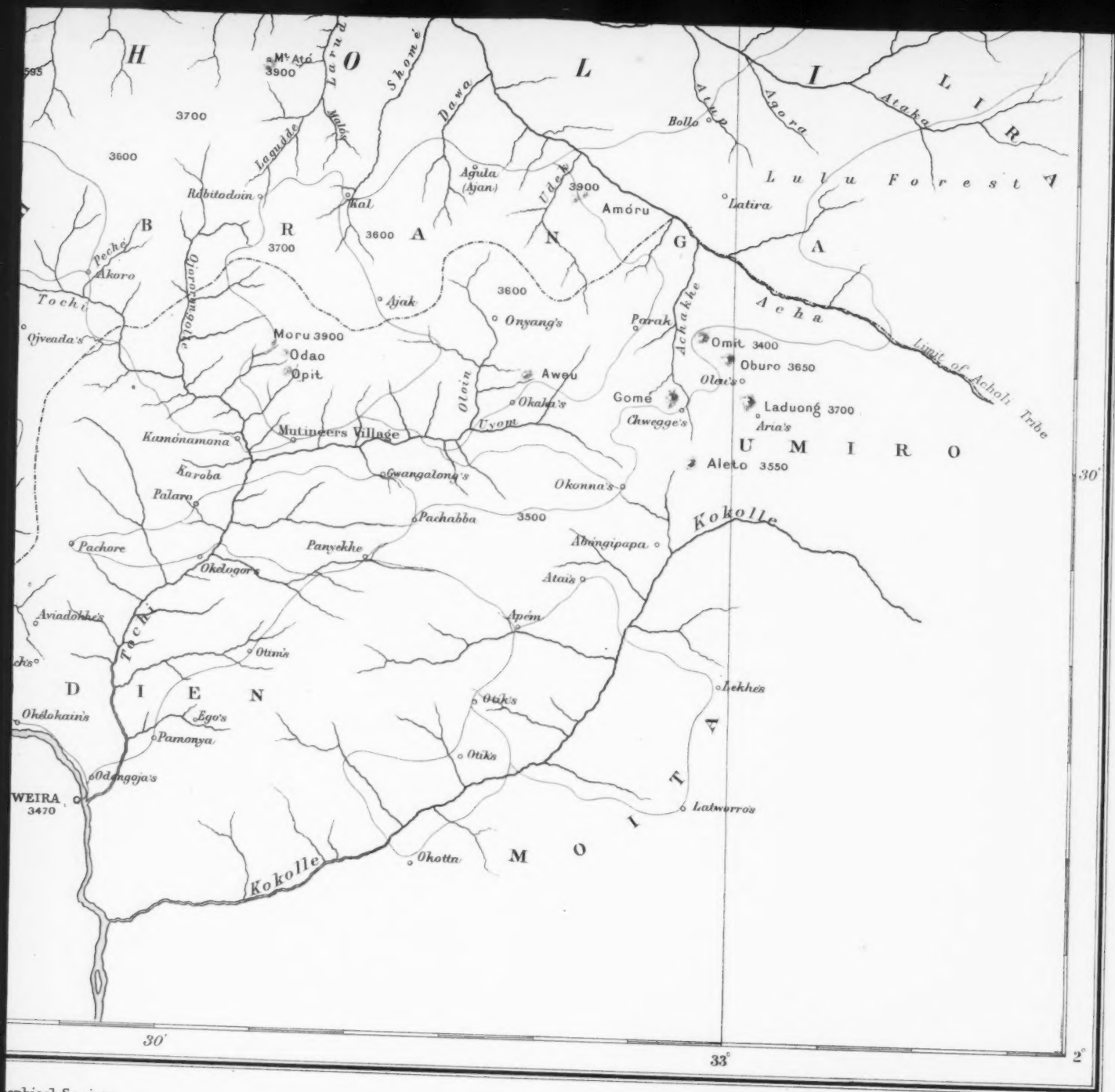

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